



**VOLUME I**  
**FINAL REPORT & APPENDICES A & B**

**LAKE SALVAGE FACILITY SITE REMEDIATION**  
**2527-2529 WEST LAKE STREET**  
**CHICAGO, ILLINOIS**  
**AUGUST 19, 1995**

**Prepared for**

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### FIGURE A Site Remediation/Soil Sampling Plan

APPENDIX A	October 14, 1994 Phase I Bagged Ash Removal Memo
APPENDIX B	January 1995 Project Manual for the Demolition and Site Remediation of the Lake Salvage Facility
APPENDIX C	Contractor Submittals for the Demolition and Site Remediation of the Lake Salvage Site
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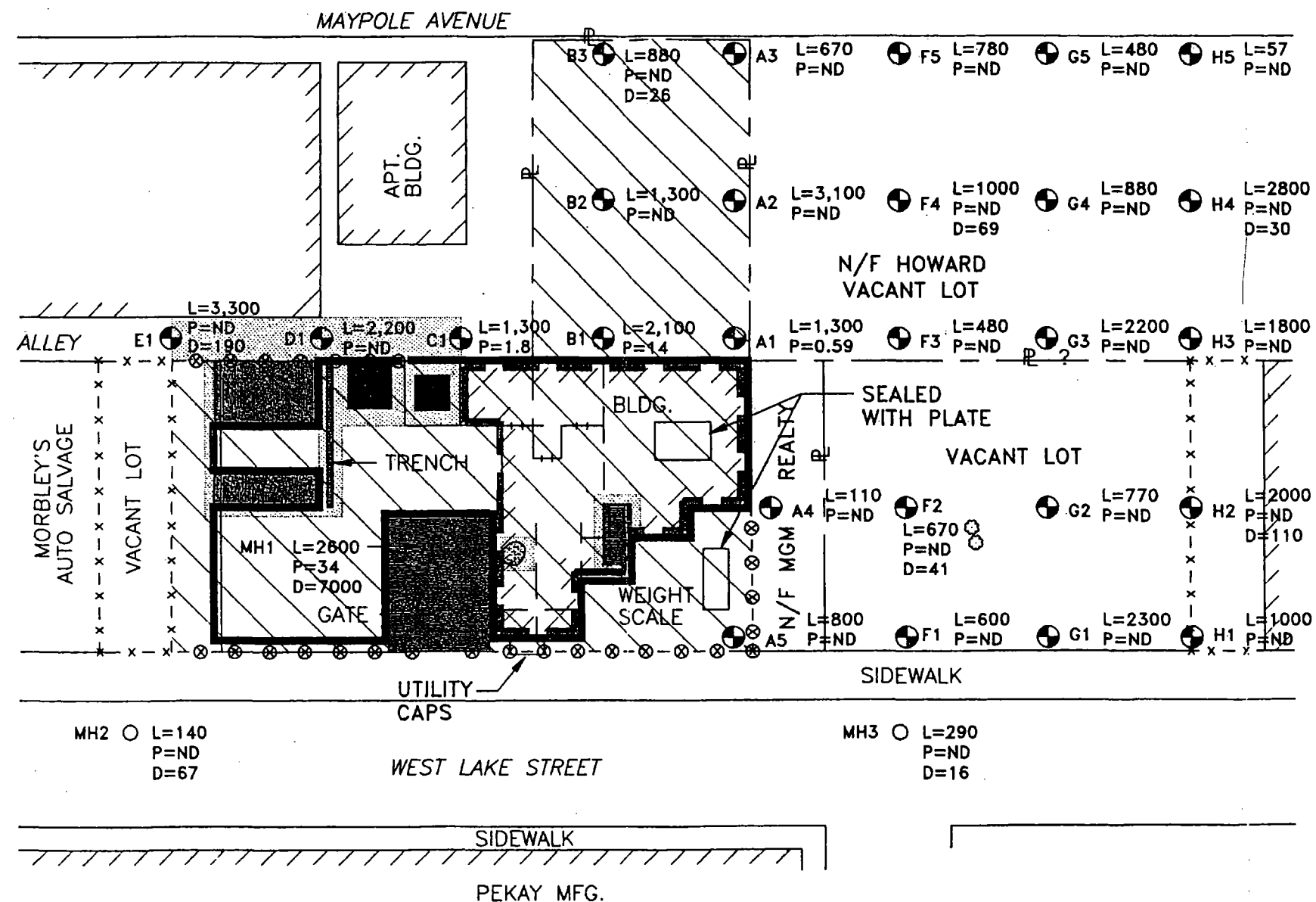


**SECTION 1**  
**INTRODUCTION**

The Lake Salvage Facility, hereinafter referred to as the site, was an abandoned scrap metal yard and cable/wire reclamation facility which reportedly began its operations in the 1950s. The operation consisted of the purchase, separation and resale of various grades of scrap metal. The Illinois Environmental Protection Agency (I EPA) granted the Lake Salvage Facility an operating permit for two incinerators on August 11, 1976. The incinerators were used to burn the insulation materials from cables/wires and other electrical equipment for the recovery of copper. The incinerator operated until September of 1986 when the Lake Salvage Facility closed. At that time, the incinerator was partially dismantled.

Numerous investigations by the I EPA and the U.S. Environmental Protection Agency (US EPA) determined that lead, dioxin/furans and polychlorinated biphenyls (PCB) were present throughout the site in incinerator ash. Based on the preceding information, the US EPA mobilized to the site to perform an emergency remediation action which encompassed the consolidation of ash on the site.

Subsequently, Litton Systems, Inc. offered to participate in the disposal of the accumulated consolidated ash material and other activities at the site in accordance with an Administrative Consent Order dated September 29, 1994. The purpose of this final report is to summarize activities encompassing the assessment, design and remediation of the site in accordance with the Administrative Consent Order and in accordance with 40 CFR Part 300.165 titled "OSC Reports". This report basically follows the outline in this Code of Federal Regulations for "OSC Reports". Since a significant amount of information has already been submitted in the form of previous reports which are included in the attached Appendices, limited duplication has been provided in the text of this summary report for brevity. When necessary, the reader should refer to the applicable reports for further detailed information about the subject matter.



# **LEGEND**

- |                                     |  |
|-------------------------------------|--|
| ⊙ SOIL SAMPLES                      | ▨ AREAS INSIDE CONSIDERED TO EXHIBIT HAZARDOUS WASTE CHARACTERISTICS |
| L= LEAD mg/kg                       | ⊙ PREVIOUS ASH PILES   |
| P= PCBs mg/kg                       | ■ INCINERATORS   |
| D= EPA/TEQ DIOXIN Pg/g              | ▧ BUILDING   |
| ▧ SITE                              | x-x FENCE  |
| ⊕-⊕ PROPERTY LINE                   | ⊙-⊙ REMOVED FENCE  |
| ALL LOCATIONS AND AREAS APPROXIMATE | ▨ FILLED WITH CLEANED MASONRY CAPPED WITH PROCESSED GRAVEL           |
|                                     | — ENCAPSULATED SURFACES INSIDE LINE                                  |
|                                     | — C & D DISPOSAL INSIDE LINE   |

**FIGURE A**

**DEMOLITION & REMEDIATION PLAN  
SOIL SAMPLING RESULTS  
LAKE SALVAGE CO.  
CHICAGO, IL**

**TIGHE & BOND INC. CONSULTING ENGINEERS  
WESTFIELD, MASS.**

SCALE: 1"=50'

DATE: JULY 1995



## **1.0 SUMMARY OF EVENTS**

The following summary includes a chronology of events as required in 40CFR300.165 part (a)(1).

**1.1 Previous Actions** - On August 11, 1976 the I EPA granted the Lake Salvage Facility an operating permit for two incinerators. The incinerators operated until September 1986 when the Lake Salvage Facility was closed. At that time, the incinerator facilities were partially dismantled.

On April 15, 1987, I EPA collected ash samples from the site as part of an I EPA commissioned site evaluation. The analytical results indicated that elevated concentrations of dioxins/furans (hereinafter referred to as dioxins) were present at the site. In July 1987, I EPA officially withdrew the Lake Salvage Facility's operating permit for the incinerator.

On July 11, 1990, the US EPA Field Investigation Team (FIT) conducted a preliminary assessment of the site. As a result of the assessment, a number of concerns were raised including the perimeter wooden fence was in disrepair, the west court yard contained an uncovered tank and approximately 20 empty drums. The east court yard contained scrap wood, scattered debris and approximately 70 uncovered drums. Some of the drums were filled with what appeared to be incinerator ash; in addition scattered drums containing lumber were observed in both court yards.

FIT observed a small concrete covered trench located immediately west of the scrap wood pile which contained soil and incinerator ash. Two inoperable incinerators were located approximately 50 feet east of the west on-site boundary and five feet north of the southern boundary. See Photo 1-26 in Appendix J.

Seven soil samples were collected by FIT and the samples were analyzed for the US EPA Target Compound List, polychlorinated biphenyls (PCBs), and dioxins. PCBs, dioxins, lead and other constituents were detected in on-site surface samples.

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In March of 1994, US EPA's On Scene Coordinator (OSC) and Technical Assistance Team (TAT) conducted a site assessment. The site was partially fenced and again in disrepair. Site access was not completely restricted in several areas of the site as evidence of trespassing included vandalism, graffiti, bottles, rubbish and tires were found throughout the site. All of the drums previously noted were found uncovered in the east storage yard. Many of the drums were tipped over and ash was scattered throughout the storage yard. Two inoperable incinerators were found to be in very poor condition. A car seat was found inside the open west incinerator.

The on-site cinder block building was in poor condition and displayed failing and severely cracked walls. Several partially burned capacitors were found scattered throughout the storage yard and mixed with drum ash. Ash samples were obtained from the west incinerator, one of the drums and an ash pile located within the building. A sample of fire brick was collected from both incinerators. Wipe samples were obtained from the incinerator and outside of the cinder block building near the incinerators. Preliminary results confirmed elevated levels of dioxins and furans in the ash.

On April 19, 1994, US EPA mobilized to the site to perform an emergency remediation action. By April 23, 1994, the US EPA had consolidated ash from the east storage yard and from the open west incinerator and bulk bagged the ash into a roll off box. The fence and building access points were reinforced to restrict site access.

### 1.2 Ash Removal

Pursuant to the signed Administrative Consent Over dated September 29, 1994, Litton Systems, Inc. offered to participate in the disposal of the accumulated ash material as well as undertake other remediation activities at the site.

On October 13, 1994 the ash was transferred to a lined rolloff trailer and trucked by Capital Transport of Calumet City, Illinois to the EnviroSafe Facility in Boise, Idaho for hazardous waste disposal. Tighe & Bond of Westfield, Massachusetts was retained to coordinate and oversee the ash removal and to design and oversee the

demolition/remediation of the site. The Phase I bagged ash removal is summarized in the memo dated October 14, 1994 and is shown in Appendix A. Included is a summary of the activity as well as the manifest for waste from the site. Included in Appendix A are the results of asbestos sampling of the incinerator during this activity. The results show that asbestos was not detected in any of the samples collected at the site.

On October 13, 1994, Mr. Zen Kruczkowski, P.E. and Mr. Thomas Couture, P.E. of Tighe & Bond made a determination that the structural integrity of the buildings located at the Lake Salvage Facility warranted immediate demolition as it presented a threat to public safety. At the same time, a site sampling plan was developed to determine the extent of contamination. The data generated through site characterization was utilized to develop the proposed work plan for the remediation activities at the site, which was subsequently approved by the US EPA. The finalized workplan is included as part of the remediation specifications found in Appendix B.

### 1.3 Contamination Assessment

On December 14, 1994, Mr. Zen Kruczkowski of Tighe & Bond performed sampling at the Lake Salvage Facility to determine the extent of dioxin, PCB and lead contamination and to quantify surfaces and areas which would require work. During this sampling period, the manhole and west vacant lot could not be sampled since no access arrangements were in place. However, sampling was conducted on the vacant lot immediately south of the property. Figure A illustrates the various analytical results as well as the specific sampling sites. The corresponding analytical data from the laboratory and backup QA/QC is in Appendix G. Please note that the analytical data for dioxins is presented as US EPA/Toxicity Equivalence Factor (US EPA TEQ) on Figure A. These are the hazard equivalents totaled for each specific dioxin/furan isomer. All other data is summed dioxin unless otherwise noted.

The data showed that lead, PCB and dioxins were present throughout the site in both the on-site and off-site samples at highly varying concentrations. An evaluation of Cleaning methods was performed using the US EPA "Guide for Decontaminating Buildings,



Structures and Equipment at Superfund Sites" dated March, 1985, to provide a number of options for remediation activities at the site. Based on the highly variable results as shown in the data, it was determined that a number of tests would be required to evaluate which cleaning method would be most effective for the particular surfaces encountered at the site.

#### **1.4 Remediation Specifications**

As part of the overall remediation project, Specifications were developed to undertake experimental cleaning methods which would allow for a thorough evaluation of cleaning efficiencies prior to making a final selection. In addition, the bidding documents were based upon a unit price in order to allow for as much cleanup as necessary to remediate the site in accordance with the established thresholds in the Administrative Consent Order.

In accordance with Litton Systems, Inc. Corporate Policy, several bidders were invited to submit proposals for the demolition and site remediation, and it was determined that Central State's Environmental Services of Centralia, Illinois (CSES) was the lowest responsible bidder for the work at the site. A subsequent review of qualifications and references for the low bidder resulted in Tighe & Bond recommending CSES for the work at the site.

#### **1.5 Cleaning Evaluation**

On April 10, 1995, CSES performed the experimental cleaning evaluation test at the site under the direct supervision of Tighe & Bond's representative, Michael Matilainen CIH. While on site, the contractor also performed waste characterization analyses of the various waste streams at the site in preparation for the final remediation. The rationale for the waste characterization analyses at this time was to eliminate the need for stockpiling materials on-site during the remediation. This procedure also allowed for developing a comprehensive work plan for the site and loading of the materials directly into the vehicles for off-site transport. The results of these activities are described in the May 25, 1995 progress report contained in Appendix D.

In general, it appeared that the cleanup methods were equally efficient in their cleaning efficiencies. The vacuuming achieved adequate cleanup in wall test areas but unacceptable levels of dioxins on the floors. Consequently, vacuuming was employed to decontaminate the facility followed by encapsulation of any floor surfaces left at the facility pursuant to the stipulations in the Administration Consent Order. The preceding information and recommended remedial strategy was forwarded to both Litton Systems, Inc. and US EPA and subsequently approved.

### **1.6 Manhole Sampling**

The sampling of the manholes indicated that the on-site manhole (at a loading dock) contained elevated amounts of lead, PCB and dioxin whereas the manholes located on the street had considerably less contamination. Based on the preceding information, Litton Systems, Inc. had the on-site manhole cleaned under a change order to the contract. Please note that the levels shown on Figure A were before the remediation of the manhole.

### **1.7 Remediation**

On June 12 - 21, 1995 the Contractor performed the remediation of the site. Tighe & Bond's, Michael Matilainen and Ecology & Environment, Inc.'s (US EPA's on-site representative), Larry Leuck, were present throughout the entire remediation project. In addition, the US EPA's OSC, Fred Bartman, occasionally visited the site.

Activities undertaken during the period are fully detailed in Appendix E, which is the Contractor Closeout Report, Appendix F, Tighe & Bond's Inspection Information and Figure A which follows. The following summarizes the major remediation activities undertaken at the site.

The Contractor started work at the site on June 12, 1995. The initial work effort included the removal of all litter and debris from inside the facility into a rolloff container. Based on the Contractor's waste characterization which indicated the material to be non-hazardous, the material was disposed off at a Construction and Demolition

(C&D) Landfill. Both Larry Leuck of Environmental & Ecology and Fred Bartman of the US EPA were on-site at the startup of the project. Mr. Bartman informed Tighe & Bond and CSES that no confirmatory wipe sampling would be required for surfaces that were to be encapsulated as was initially proposed in the work plan.

Air sampling and monitoring of the Contractor's activities were performed by Tighe & Bond's on-site representative. During the site remediation activities, air sampling was performed at each outside corner of the site and inside the building for respirable particulates, oxygen deficiency, volatile organic compounds, explosive vapors and carbon monoxide. In addition, observations were made on both wind direction and speed and other variables which would effect the air monitoring activities. All data are presented in the Tighe & Bond Inspection Information located in Appendix F.

The following instruments were utilized for monitoring the air at the site. Respirable particulate was monitored with an MIE PDM-3 photo aerosol meter. This instrument measures respirable particulate in milligrams per cubic meter with median diameter of less than 10 microns. Oxygen deficiency, explosive gases and carbon monoxide were monitored with a Gastec GX86 Four gas Meter. Oxygen deficiency is presented in percent oxygen, lower explosive limit is presented in percent explosive limit and carbon monoxide is presented in parts per million. Volatile organic compounds were measured with an HNU-101 photoionization detector with an 11.8 EV probe and the resulting data are presented in parts per million referenced as benzene.

In general, air sampling throughout the project indicated acceptable levels (in accordance with the work plan) which were established for the site. It should be noted that particulate levels were elevated throughout the project and were generally the result of construction activities (not related to the project) that were taking place on West Lake Avenue. In addition, traffic from West Lake Avenue created a significant amount of dust in the general vicinity of the site. CSES utilized wet methods throughout the entire project to keep on-site dust levels to a minimum. A number of photos in Appendix H show these wetting activities.

In addition to the above sampling, both Tighe & Bond personnel and CSES personnel wore personal air monitors for the determination of lead in the worker breathing zone. The results of this sampling reported on June 16, 1995 indicate that full shift sampling for lead during the remediation and around the site ranged from 2 to 8 micrograms per cubic meter calculated as time weighted average over the time period sampled. The applicable worker exposure level for lead in construction as established by the Occupational and Safety Health Administration (OSHA) is 50 micrograms per cubic meter. This sampling shows that actual levels of lead in dust were very low and within acceptable OSHA standards during the sample periods. It also shows that any dust potentially emanating off site would not contain hazardous levels of lead.

On July 13, 1995 the Contractor continued the removal of all litter from inside the facility into a rolloff container. CSES removed ash piles from inside the building into the incinerator building for subsequent disposal as hazardous waste.

Fred Bartman and Brian Kopel of CSES obtained approval from the City of Chicago to demolish the facility. The Contractor subsequently removed the stack from the incinerators by connecting the stacks to a loader by a cable and cutting the retaining bolts on the base. See Photo 1-11. All incinerator materials and portions of surrounding building were subsequently demolished and stockpiled.

Two drums of unknown material were found inside the building during the litter cleanup. It appeared that one contained a resin material and one contained an oil product. Both drums were staged in the incinerator area for subsequent disposal as hazardous waste. These drums are shown in Photo 1-18. The Contractor completed the demolition of the incinerators and the majority of litter removal on June 13, 1995. No excursions above the established air sampling standards were observed during the air monitoring activities for the site on June 13, 1995.

On June 14, 1995, the Contractor's hazardous waste hauler, Dart Trucking, arrived on site. Three loads of hazardous waste were removed from the site. However, there were



some logistical problems in terms of the amount of weight that each truck could carry. Only three loads were removed from the site that day.

In accordance with Fred Bartman's direction, the trench located at the site was cleaned out. See Photos 2-19 and 2-20. In addition, the alley way immediately adjacent (samples C-1, D-1 and E-1) was also cleaned out. All of the litter was removed to a C&D landfill and approximately 1" of soil was scraped from the surface area. Two other areas in the southeast corner of the site appeared to have ash on them. Therefore, a 6"-12" depth of soil was removed from these two areas. The two additional areas are shown in Photo 2-21 and 2-22 and 4-14. These additional materials resulted in a significant amount of additional soil which was considered hazardous waste. No excursions over the preestablished air monitoring standards were observed on June 14, 1995.

On June 15, 1995, the Contractor cleaned out the manhole which is located adjacent to the loading dock of the site. The Contractor removed approximately 1 cubic yard of sludge from the manhole. The manhole was approximately 10 feet deep and 4 feet in diameter and approximately 5 feet of sludge was removed from the manhole and disposed of as a hazardous waste. During the entry into the manhole, air sampling was performed to ensure that the space was acceptable for entry. See Photos 2-6 and 2-7.

The Contractor also removed approximately 403 passenger car tires and 9 semi-trailer truck tires. National Tire transported the tires for subsequent recycling. The tires were washed prior to removal from the site. See Photos 2-3, 2-4 and 2-5.

All air sampling was within acceptable standards except for carbon monoxide. Elevated levels of carbon monoxide were observed inside the building during the vacuuming of the building. All areas of the building and floor were vacuumed with a unit which was equipped with a high efficiency particulate air (HEPA) filter. The elevated carbon monoxide was a result of a gasoline engine driven generator which was placed adjacent

to the entrance of the building. The Contractor was advised to remove the generator from the entrance to the building and the levels of carbon monoxide subsided.

On June 16, 1995, the Tighe & Bond inspector performed a visual evaluation of the area inside the building. The majority of all areas and floor surfaces inside the building appeared to be visually clean and adequately vacuumed. However, four additional areas were identified where the Contractor had to perform some limited cleanup. This work was completed and the area passed the final inspection. Photos 3-9, 3-10, 3-11 and 5-2 illustrate the level of cleanliness which was obtained by the HEPA Vacuuming.

The waste characterization performed by CSES indicated that the building walls were non hazardous. Further, the experimental cleaning test performed on April 10, 1995 indicated that the vacuum cleaning methods employed reduced residual levels of contaminants within acceptable thresholds. Based on the preceding information, Fred Bartman of US EPA determined that the cleaned bricks (slated for disposal in a C&D landfill), could be used to fill some of the depressed areas on the site. These included the loading dock, the areas where soil removal was required, the pits within the building and the depressions in and around the incinerators. Only cleaned masonry block was used for this filling. The Contractor separated all wood and metal from the masonry materials prior to filling, and only masonry was used to fill the voids to within one (1) foot of finished grade. All masonry fill was topped with clean gravel to finish grade.

Air sampling on June 16, 1995 showed levels around the site within acceptable standards during the sampling time periods. In addition, confirmatory air sampling inside the building was taken to downgrade the level of personal protective equipment to clothing only (without respiratory protection). All air levels within the interior of the building were within acceptable standards established for the site.

On Saturday, June 17, 1995, the Contractor removed some hazardous waste and some C&D waste from the site. The Contractor worked a short day on Saturday. Prior to

leaving, the Contractor covered the hazardous waste pile with a plastic tarp to ensure that none of the material would blow away on Sunday.

On Monday, June 19, 1995, the Contractor completed the demolition of the building. Additionally, Fred Bartman was on-site and identified several areas along the west end of the site which required additional vacuuming and ash removal. Photos 6-20, 6-25 and 6-26 illustrate that the areas designated by Fred Bartman to be cleaned up.

Tighe & Bond's on-site representative began the final soil sampling layout effort on the vacant lot to the west of the property. Based on initial calculations and grid layouts, it was determined that less samples would actually be taken than was initially identified in the approved work plan. Approval was obtained from Fred Bartman to reduce the total number of samples so long as the sampling grid complied with the 50 foot spacing requirement identified in the Administration Consent Order. Air sampling on June 19, 1995 was within acceptable standards during the sample periods.

On Tuesday, June 20, 1995, the Contractor was working on final cleanup and removal of waste from the site. In addition, Tighe & Bond and Ecology & Environment began the sampling of the vacant west lot. The results of the soils sampling activity are summarized in the progress report dated August 4, 1995 shown in Appendix H. The laboratory data is shown in Appendix G and the sampling locations/results are illustrated in Figure A. Additional information concerning recommendations related to soil sampling at the site are included in Section 4.0 of this report.

In the areas where the masonry was used for fill, the Contractor had clean gravel delivered to the site. During the unloading of the processed gravel, the contracted truck driver (Dunman Trucking) was advised to watch the overhead lines. However, the truck hit one of the disconnected overhead powerlines on the elevated rail line structures and partially lowered it several feet. OSHA inspectors, who were inspecting the paint removal from the elevated rail line, immediately responded to the site and photographed the situation. The OSHA inspectors did not appear to take any further action at the site

and the truck driver left the site. Prior to leaving, the truck driver was advised that they were responsible for tying the line backup. The line was inactive and did not present a major hazard in and around the site. No air sampling was performed on June 20, 1995, as the building was completely down and all waste was removed from the site.

On Thursday, June 21, 1995, the Contractor completed the HEPA vacuuming of exposed surfaces and the encapsulation of surfaces at the site as designated on Figure A. In addition, the fence was removed along the northern side of the site and disposed of by Alex White Salvage Trucking. A final walkthrough of the site with Brian Kopel of CSES and Larry Leuck of Ecology & Environment indicated that the site was cleaned up to satisfactory conditions. Photos 6-15, 6-17 and 6-18 are representative of the final conditions at the site.

The only item of work left remaining at the site was the utilities' caps which were painted orange as identified in Photo 6-16. On August 1, 1995, the Contractor reported that they have subcontracted a utility capping company to cap these utilities below grade at the beginning of September 1995. Photo documentation of this activity will be required and will be the last work item for the project.

Since the majority of the site represent areas of encapsulated concrete (where building and incinerators were), no top soil or seeding was placed on the adjacent graveled areas of the site. The few minor areas which were filled with processed gravel were not large enough to warrant loaming and seeding. Further, the encapsulant does not require capping with soils.

Prior to leaving the site, Tighe & Bond's on-site representative and CSES reviewed, measured and calculated the final quantities of work performed for preparation of the final pay requisition. The Contractor spent the afternoon loading up equipment and performing final grading. The Contractor demobilized from the site at approximately 1500 hours on June 21, 1995. All finalized waste destinations and quantities are shown in the Contractor's completion report and Tighe & Bond's on-site inspection report.



### **1.8 Report**

On August 12, 1995, Tighe & Bond received the Contractor's final closeout report for the project regarding remediation of all waste, encapsulation and site grading. Upon receipt of this information, Tighe & Bond completed this report.

### **1.9 Other Regulatory Requirements**

In accordance with 40 CFR 300.165(c)(1)(i) the discharge of hazardous substance at the site was not in connection with activities regulated under the Outer Continental Shelf Lands Acts (OCSA), the Trans Alaska Pipeline Authorization Act, or the Deep Water Port Act.

In accordance with Paragraphs (iii), the initial situation at the site is fully described in the preceding sections.

In accordance with Sections (iv), efforts to obtain response by responsible parties is currently being addressed by Litton Systems, Inc.

Under paragraph (v), the organization of the response, including state participation has been identified at the beginning of this section.

Under paragraph (vi) the resources committed must be identified for the site. The letter dated July 31, 1995 to Litton Systems, Inc. in Appendix I provides a summary of the resources committed to date for the cleanup of the site. The enclosed costs only include the Contractor (CSES) and Tighe & Bond's costs. The Estimate of Costs do not include the US EPA OSC or Team Contractor, Litton Systems, Inc.'s legal fees or state activities.

Under Paragraph (vii) and (viii), it is unlikely that any natural resources were damaged by the activity. The site is located in an area which has had significant industrial usage over the years. Further, it appears that a multiple number of off-site sources may have impacted the site.

Under Paragraph (ix) an initial threat abatement was completed by the US EPA as is described in the chronology of events in Section 1.1.

Under Paragraph (x) a number of treatment/disposal alternative technologies were evaluated for remediation for the Lake Salvage site. These included a thorough evaluation of a number of cleaning methods to include vacuuming, power washing, chemical washing and mechanical scarification. In addition, a number of disposal options were evaluated for the various portions of the building as well as the incinerators and litter found inside the building. These methods were evaluated and selected based on a review of the US EPA building decontamination publication previously cited.

Based on the preceding, a unit cost remediation specification was completed for each type of cleaning method evaluated. This provided Litton Systems, Inc. a baseline comparison method to determine which remediation technique would be the most cost effective. To further evaluate the effectiveness of the remediation methodologies involved, the actual cleaning methods were then evaluated by the contractor as described in the chronology of events and as more fully described in the appendices attached hereto.

Under Paragraph (xi), the following Public Information/Community Relations Activities were undertaken during the project. Before starting the project, Litton Systems, Inc. published a required notice in the Chicago Tribune that Litton signed an Administrative Consent Order with the US EPA for the clean up of the former Lake Salvage Facility. Mr. Fred Bartman of the US EPA coordinated remedial activities and demolition of the building with the City of Chicago. Mr. Bartman served as liaison between Litton Systems, Inc., Contractor (CSES) and the City of Chicago to facilitate all necessary permits for the activities conducted at the site.

During the remediation activities, the Team Contractor and Tighe & Bond Inspector provided public relations at the site. This included securing of the perimeter of the site and providing general information to interested parties.

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**SECTION 2**  
**EFFECTIVENESS OF REMOVAL ACTIVITIES**

The information contained in this section of the report provides a determination of the effectiveness of removal actions conducted at the site in accordance with (c)(2).

At the start of this project, the Lake Salvage Facility was dilapidated with no controlled access. In addition, the structural integrity of the building was such that the building at the site presented a significant public health and safety hazard. Uncontrolled ash and other materials were present at the facility which provided potential exposure routes to anybody who may have trespassed onto the property.

Since the remediation of the site, the preceding hazards have effectively been removed from the site of the former Lake Salvage Facility. Based on appropriate waste characterizations for each type of material at the site, uncontrolled regulated and non-regulated materials have been removed from the site and disposed of lawfully. The remaining floor slab left at the site was cleaned and encapsulated in accordance with the US EPA approval.

The dangers of the structural integrity of the building have been removed by the demolition of the facility. Further, the loading dock pit on the site, which represented a fall hazard, has been filled and eliminated.

Based on the preceding, the hazards associated with the former Lake Salvage Facility have been effectively eliminated in accordance with the US EPA approved workplan.

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SECTION 3

SECTION 3  
DIFFICULTIES ENCOUNTERED

A minimal number of difficulties arose during the remedial activities undertaken at the site. The major difficulties are summarized herein, and are further detailed in the chronology of events in Section 1 as required in (c)(3).

Initial efforts to obtain a variety of permits from the City of Chicago were generally unsuccessful due to extremely long waiting periods. However, Mr. Fred Bartman of the USEPA was extremely helpful in securing approval from the City of Chicago to remediate and demolish the facility.

The work at the site initially called for temporary connection for both water and electrical. In that a formal demolition approval was not initially issued by the City of Chicago, these two temporary connections could not be obtained at the start of the project. Although, the Contractor had to employ a tank truck for water as well as a generator for electricity, the project was successfully completed in the appropriate time frame.

The work plan specified capping the utilities below grade. The existing utilities are currently capped at the site but above grade. They are marked with fluorescent orange paint to minimize the potential for damage. The City of Chicago is currently experiencing significant work delays due to the extremely hot weather and cannot cap the City services immediately. As a result of these delays, the Contractor has employed the services of a private contractor to cap the existing utilities below grade. This should occur in the beginning of September 1995 and will be photo documented at the time it occurs.

According to Larry Leuck of Ecology & Environment, one of the water utilities was apparently damaged after the remedial activities were completed. Based on an initial assessment by his firm, it was determined that the water leakage was from a partially

broken cap. The leak of the water cap at the former Lake Salvage Facility is reportedly a trickle. It was determined that the leak was not significant and that the repair of this item could wait until early September. It should be noted that there were numerous other water main leaks in the local area which were causing water flooding in the area, but not related to site remediation activities.

C325\REPORT\SEC-3.MJM







## SECTION 4

### RECOMMENDATIONS

The following section summarizes the recommendations for the report, as required in (c)(4).

The remediation effectiveness for the former Lake Salvage Facility is documented in Section 3 of this report. All waste has been disposed of in accordance with the approved work plan and applicable cleanup thresholds were achieved during remediation. Based on the preceding, we recommend that no further action be taken at the site.

Extensive soil sampling assessment was performed at the site which illustrated that lead, dioxins and PCBs are prevalent around the site with no particular trends or patterns around the site. A review of the available literature for lead indicates that a number of ambient and multiple off site sources could be contributing to the lead concentrations at the site including, but not limited to, automobile emissions, smelting operations and lead paint, as shown in Appendix H. In fact, a significant amount of dust was observed emanating from the painting containments of the elevated bridge structures (immediately adjacent the site) during reported elevated rail deleading activities. See Photos 4-12, 5-7 and 5-17.

Further, background sampling indicates that detectable concentrations of lead, PCBs and dioxins are found at sites away from the site. In addition, the area in and around the site has been filled with offsite materials throughout the years as is evidenced in Photo 5-22. Due to these specific situations and a number of other potential off site sources, it cannot be determined the offsite PCBs, dioxins, and leads are actually from the former Lake Salvage Facility. Based on the preceding, we recommend that no further assessment be performed in and around the site.

In conclusion, the activities described herein have been conducted in accordance with the approved US EPA work plan with US EPA approved exceptions as noted

**Tighe&Bond**

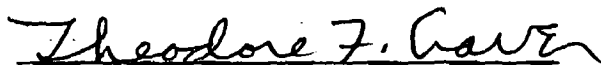
herein. In accordance with the Administrative Consent Order for the former Lake Salvage Facility, the following certification is provided by both Tighe & Bond and Litton Systems, Inc.

"Under penalty of law I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate and complete."

Respectfully submitted



Thomas C. Couture, P.E.  
Assistant Chief Engineer  
Tighe & Bond



Theodore F. Craver  
Litton Systems, Inc.  
Staff Vice President and  
Director of Environmental Affairs  
Litton Industries, Inc.  
for Litton Systems, Inc.

C325UREPORTSEC-4.MIM

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**APPENDIX A**

**October 14, 1994 Phase I Bagged Ash Removal Memo**

C-325-1-310

MEMORANDUM

TO: Ted Craver, Litton Systems, Inc  
FROM: Zen Kruczkowski  
SUBJECT: Lake Salvage/Phase I  
DATE: October 14, 1994

The bagged ash was loaded by the Contractor Friday AM. I reached the site after 9:00 AM. Present at the site was a representative of Ecology & Environment (E&E), Mike Mangini. The Contractor was in the process of transferring the 1 yard bags to a lined bulk trailer using a crane. One or two of the bags were ripped and the Contractor wrapped them in tarp prior to placing them in the lined trailer. The roll off is apparently rented by E&E and Mark Mangini told me that E&E will arrange for its return.

The work was completed at approximately 11:00 AM. However, we had to wait for the Manifest to be delivered to the site. Labeling of the bags was completed by approximately 1:00 PM. The manifest was filled out by the Contractor and signed by me as agent for Litton Systems. Mike Mangini secured the gate and I left the site.

During the loading operation, I sampled some of the material lining the two incinerators and we will have it analyzed for asbestos.

F:\Home\ZJK\C3251014.MEM

TCC 10/14/94

C 325  
**Tighe & Bond**

Consulting Engineers  
Environmental Specialists

Phase I

File No. C-325-1-310

Re: Manifest #IL6525811

Date: October 14, 1994

Litton Industries

1725 Jefferson Davis Highway

Arlington, VA 22202

Attn: Mr. Ted Craver

We are sending:

☐

drawings

☐

shop drawings

☐

specifications

☒

other documents

as listed below:

No. Copies	DWG.#	Title
1		Manifest #IL6525811

☐

approved

☒

for your file

☐

approved as noted

☐

as requested by

☐

revise and resubmit

☐☐

not approved

Remarks Ted: attached please find an original copy the Lake Salvage site manifest.

Copies to:

Very truly yours,  
Tighe & Bond, Inc.

Zen Kruckowski, P.E.





PLEASE TYPE

(Form designed for use on elite (12-pitch) typewriter.)

EPA Form 8700-22 (Rev. 6-89)

Form Approved. OMB No. 2050-0039, Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law, but is required by Illinois law.	
3. Generator's Name and Mailing Address LAKE SALVAGE 2527 W. LAKE ST CHICAGO, ILL.		Location If Different		A. Illinois Manifest Document Number IL 6525811 FEE PAID IF APPLICABLE		
4. *24 HOUR EMERGENCY AND SPILL ASSISTANCE NUMBERS*		6. US EPA ID Number 1LD006875285		B. Illinois Generator's ID 016875285		
5. Transporter 1 Company Name CAPITOL TRANSPORT INC.		8. US EPA ID Number 1LD000781419		C. Illinois Transporter's ID B2F2		
7. Transporter 2 Company Name N/A		8. US EPA ID Number N/A		D. Transporter's Phone 708-868-4300		
9. Designated Facility Name and Site Address ENVIRONMENTAL SERVICES OF ILLINOIS 2710 SUNRISE BLVD. S. BOONVILLE, ILL. 62705		10. US EPA ID Number IDD073117654		E. Illinois Transporter's ID N/A		
				F. Transporter's Phone N/A		
				G. Illinois Facility's ID N/A		
				H. Facility's Phone 708-584-1500		
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. R.O. HAZARDOUS WASTE, SOLID N.O.S. NA3077, PG III (0008) WSID #16224002		IN	BULK	22 Y		X-X EPA HW Number Authorization Number
b. HA						X-X EPA HW Number Authorization Number
c. N/A						X-X EPA HW Number Authorization Number
d. N/A						X-X EPA HW Number Authorization Number
J. Additional Description for Materials Listed Above N/A		K. Handling Codes for Wastes Listed Above In Item #14 G = Gallons Y = Cubic Yards				
15. Special Handling Instructions and Additional Information N/A						
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.						
Printed/Typed Name Zan Kowalski		Signature [Signature]		Date Month Day Year 10/13/94		
17. Transporter 1 Acknowledgement of Receipt of Materials		Signature [Signature]		Date Month Day Year 10/13/94		
18. Transporter 2 Acknowledgement of Receipt of Materials		Signature [Signature]		Date Month Day Year		
19. Discrepancy Indication Space						
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.		Signature [Signature]		Date Month Day Year		

*The Illinois Uniform Manifest must be used for all shipments of special waste (hazardous and nonhazardous) stored, disposed of, treated or reclaimed in Illinois; and for all shipments originating in Illinois and destined for states that do not print and supply the form. PMW (Potentially Infectious Medical Waste) requires a different manifest. For shipments not originating in Illinois, if the generator's state requires copies of the manifest, a photocopy of part I should be used.*

**INSTRUCTIONS TO GENERATORS (Please type)**

1. Enter generator's USEPA twelve digit identification number and the unique five digit document number assigned to this Manifest (eg. 00001) by the generator.
2. Enter total number of pages comprising this Manifest.
3. Enter generator's name and mailing address. If location of waste generation is different from mailing address, enter location to the right of mailing address.
4. Enter telephone number where an authorized agent of the generator, who has knowledge of the waste, may be reached in the event of an emergency.
- B. Enter the generator's Illinois EPA ten digit identification number.
- 5,6,C,D. For the first transporter who will transport the waste, enter the company name, US EPA ID number, Illinois EPA four digit Special Waste Hauling (SWH) permit number, and telephone number where an authorized agent of the transporter may be reached in the event of an emergency.
- 7,8,E,F. If applicable, enter the information requested for the second transporter who will transport the waste.
- 9,10,G,H. For the facility designated to receive the waste, enter company name, address, US EPA ID number, Illinois EPA ten digit facility code number, and telephone number where an authorized agent of the receiving facility may be reached.
11. Enter the US DOT Proper Shipping Name, Hazard Class, and ID number (NA/UN number) for each waste as identified in 49 CFR 171 through 177. For wastes not regulated as Hazardous Materials by DOT, enter a description of the waste and the generic name of the waste, plus the phrase "not hazardous by DOT."
12. Enter the number of containers for each waste and the appropriate abbreviations for the type of container:

CM = Metal boxes or roll-offs	DM = Metal drums
CW = Wooden boxes	DW = Wooden drums
CF = Fiberboard or plastic bags	DF = Fiberboard or plastic drums
BA = Burlap, cloth, paper or plastic bags	CY = Cylinders
DT = Dump trucks	TT = Tank trucks
TC = Tank cars	TP = Tanks portable
13. Enter the total quantity (gallons or cubic yards) of each waste.
14. Enter G if quantity is in gallons or Y if quantity is in cubic yards. No other unit is to be used. To track weight if desired, enter pounds, tons or kilograms in Section J.
- I. Enter the EPA 4 digit Hazardous Waste Number: if waste is a mixture of listed and characteristic wastes, the listed waste must be entered - other numbers should be listed in Section J. For nonhazardous special wastes, enter Class A. Enter the Illinois EPA six digit waste stream permit (authorization) number for the waste stream (these numbers are specific for each waste stream and companies, and are obtained from the receiving facility) (leave blank for waste going out of Illinois).
- J,K. If needed, enter additional description or information/instructions for the material listed in item 11.
15. If needed, indicate special transportation, treatment, storage, or disposal information, or Bill of Lading information. For international shipments, generators must enter the point of departure (City and State) for shipments destined for treatment storage, or disposal outside the jurisdiction of the United States in this space.
16. The generator must read, sign (by hand), and date the certification statement. If a mode other than highway is used, the word "highway" should be lined out and the appropriate mode (rail, water, or air) inserted in the space below. If another mode in addition to highway is used, enter the appropriate additional mode.

**GENERATOR: RETAIN COPY 6 AND MAIL COPY 5 TO IEPA WITHIN 2 DAYS OF THE SHIPMENT**

**INSTRUCTIONS TO TRANSPORTER: 17,18.** The person accepting the waste on behalf of the transporter must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt. **UPON DELIVERY OF WASTE TO FACILITY,** retain copy 4 and leave remaining copies with the facility owner/operator.

**INSTRUCTIONS TO OWNERS AND OPERATORS OF TREATMENT, STORAGE, OR DISPOSAL FACILITIES:**

19. The authorized representative of the designated (or alternate) facility's owner or operator must note in Item 19 any significant discrepancy (as defined in 35 Ill. Adm. Code 725.172) between the waste described on the Manifest and the waste actually received at the facility. Reference the discrepancy by line A, B, C, or D.
20. Print or type name of the person accepting the waste on behalf of the owner or operator of the facility. That person must acknowledge acceptance of the waste by signing and entering the date of receipt.

*Retain copy 3, send copy 1 to the generator, and send copy 2 to Illinois EPA (within 30 days of the delivery).*

Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment, storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden to: Chief, Information Policy Branch, PM-223, U. S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20480; and the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

**CERTIFICATE OF ANALYSIS**

**Client:** Tighe & Bond  
53 S. Hampton Road  
Westfield MA 01085

**Report Date:** 10/20/1994  
**Project:** C325-Lake Salvage  
**Project No.:** C325-1-310

**BULK SAMPLE ANALYSIS SUMMARY**

**Lab No.** 315888  
**Client No.:** 1

**Material Description:** Tan Fibrous Material  
**Location:**

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
PC None Detected	None Detected	40	Fibrous Glass	45
		15	Wollastonite	

**Lab No.** 315889  
**Client No.:** 2

**Material Description:** Tan/Grey Fibrous  
**Location:** Material

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
PC None Detected	None Detected	55	Fibrous Glass	45

**Lab No.** 315890  
**Client No.:** 3

**Material Description:** Grey/Off-White  
**Location:** Fibrous Material

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
PC None Detected	None Detected	15	Fibrous Glass	84
		1	Wollastonite	

**Lab No.** 315891  
**Client No.:** 4

**Material Description:** Tan Fibrous Material  
**Location:**

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
PC None Detected	None Detected	40	Fibrous Glass	50
		10	Wollastonite	

**NIST-NVLAP No. 1165****NY-DOH No. 11021****AIHA Lab No. 444**

*This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP or any agency of the U.S. government.*

**Analysis Method:** EPA 600/M4-82.020

**Comments:** (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Small Asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique.

**Analysis Performed By:**

*H. Sonny Robb*  
H. Sonny Robb, AIHA-AAR 4883

**Approved By:**

*Frank E. Ehrenfeld, III*  
Frank E. Ehrenfeld, III  
Laboratory Director

**Date:** OCT 17 1994

Mike Matilainen  
Fighe & Bond  
53 S. Hampton Road  
Westfield, MA 01085

# - Chain of Custody -

Project Name: C325-LAKE SALVAGE  
Project No.: C325-1-310

Ref: 413-572-3225  
413-562-5317

Contact: MIKE MATILAINEN

Instructions: Analyze ASBA - call Mike Matilainen with results

pe:

## Asbestos

## Lead

## Other

<input type="checkbox"/> Air	<input type="checkbox"/> Soil	<input type="checkbox"/> Air	<input type="checkbox"/> Soil
<input checked="" type="checkbox"/> Bulk	<input type="checkbox"/> Dust	<input type="checkbox"/> Bulk	<input type="checkbox"/> Paint
<input type="checkbox"/> Water	<input type="checkbox"/> Other	<input type="checkbox"/> Water	<input type="checkbox"/> Other

Analysis  
Method:

<input type="checkbox"/> PCM : NIOSH 7400	<input checked="" type="checkbox"/> PLM : Bulk Asbestos EPA 600	<input type="checkbox"/> TEM : AHERA
<input type="checkbox"/> PCM : OSHA	<input type="checkbox"/> PLM : Point Counting 198.1	<input type="checkbox"/> TEM : NIOSH 7402
<input type="checkbox"/> PCM : Other	<input type="checkbox"/> PLM : Other	<input type="checkbox"/> TEM : EPA Level II
<input type="checkbox"/> AAS : NIOSH 7082 (Lead in Air)		<input type="checkbox"/> TEM : Microvac Dust
<input type="checkbox"/> AAS : Lead in Drinking Water		<input type="checkbox"/> TEM : Asbestos in Water
<input type="checkbox"/> AAS : Lead in Paint ASTM D3335-85a		<input type="checkbox"/> TEM : Bulk Analysis
<input type="checkbox"/> AAS : Lead Dust/Wipe		<input type="checkbox"/> TEM : NOB 198.4
<input type="checkbox"/> AAS : Other Metals		<input type="checkbox"/> TEM : Other
		<input type="checkbox"/> Total Dust : NIOSH 0500

turnaround  
time:

FAX: 10/17/94 Verbals: 10/17/94  
date / time date / time

<input type="checkbox"/> 10 Day	<input type="checkbox"/> 5 Day	<input type="checkbox"/> 72 hour	<input type="checkbox"/> 48 hour	<input type="checkbox"/> 24 hour	<input type="checkbox"/> 6 hour	<input checked="" type="checkbox"/> RUSH
Preliminary FAX/Verbal Results Requested by:						

sample  
numbers:

Client #(s): 1 - 4 Total: 4  
(start) (end) (start) (end)

315888  
315889  
315890  
315891

Chain of  
Custody:

Relinquished: <u>[Signature]</u>	RECEIVED Date: <u>10/14/94</u> Date: <u>10/17/94</u> Date: <u>10/17/94</u> Date: <u>10/17/94</u> Date: <u>10/17/94</u>	Time: <u>5:30 AM</u>
Received: _____		Time: _____
Sample Log-in: _____		Time: _____
Sample Prep: <u>[Signature]</u>		Time: _____
Analyzed: <u>[Signature]</u>		Time: _____
QA/QC Review: <u>[Signature]</u>	Date: _____	Time: _____

Archived/Released: \_\_\_\_\_ QA/QC InterLAB Use: \_\_\_\_\_  
Date: \_\_\_\_\_ Time: \_\_\_\_\_





**APPENDIX B**

**January 1995 Project Manual for the Demolition and  
Site Remediation of the Lake Salvage Facility**

**PROJECT MANUAL**  
**THE DEMOLITION AND SITE REMEDIATION**  
**OF THE LAKE SALVAGE FACILITY**  
**2527-29 WEST LAKE STREET**  
**CHICAGO, ILLINOIS**

**ISSUED FOR BIDDING**  
**JANUARY 1995**

**Tighe & Bond, Inc.**  
**Consulting Engineers**  
**Environmental Specialist**  
**Westfield, MA 01085**  
**413-562-1600**



**ADDENDUM #1  
TO THE  
PROJECT MANUAL  
FOR THE  
DEMOLITION AND SITE REMEDIATION  
OF THE  
LAKE SALVAGE FACILITY  
2527-29 WEST LAKE STREET  
CHICAGO, ILLINOIS**

**Issued January 31, 1995**

The following changes and/or additions are hereby made to the Plans and Specifications for the above-referenced project under the provisions of Section 00100, Article 4 of the General Conditions.

Acknowledge receipt of the Addendum by inserting its number on Page 00300-10 of the Proposal. Failure to do so may subject the Bidder to disqualification.

**Item 1-1      Section 00020-1 - Invitation for Bids**

**REVISE:**                      the paragraph naming the date of the pre-bid conference.

**REPLACE:**                    the paragraph with the following:

"A Pre-Bid Conference will be held at the Lake Salvage site, 2527-29 West Lake Street, Chicago, IL on February 10, 1995 at 10:00 A.M. CST."

**Item 1-2      Section 00100 - Instruction to Bidders**

**REVISE:**                      the paragraphs labeled D.1 and H.2

**REPLACE:**                    a statement in paragraph D.1 with the following:

"... A pre-bid meeting is scheduled to be held at the site for February 10, 1995 at 10:00 A.M. CST..."

**REPLACE:**                    paragraph H.1 with the following:

"Pre-bid on-site meeting - February 10, 1995 - 10:00 A.M. CST - Mandatory"

**ADDENDUM #2  
TO THE  
PROJECT MANUAL  
FOR THE  
DEMOLITION AND SITE REMEDIATION  
OF THE  
LAKE SALVAGE FACILITY  
2527-29 WEST LAKE STREET  
CHICAGO, ILLINOIS**

Issued March 7, 1995

The following changes and/or additions are hereby made to the Plans and Specifications for the above-referenced project under the provisions of Section 00100, Article 4 of the General Conditions.

Acknowledge receipt of the Addendum by inserting its number on Page 00300-10 of the Proposal. Failure to do so may subject the Bidder to disqualification.

Item 2-1      Section 02080-6 - Hazardous Materials Abatement

REVISE:              Table 2

REPLACE:            with the following:

**TABLE 2**  
**SITE CLEAN-UP THRESHOLDS**

	Surface		Soil
	Without encapsulation	With encapsulation	
Lead (walking surface)	13 $\mu\text{g}/\text{cm}^2$	130 $\mu\text{g}/\text{cm}^2$	400 mg/kg
Lead (walls)	13 $\mu\text{g}/\text{cm}^2$	130 $\mu\text{g}/\text{cm}^2$	NA
PCBs	10 $\mu\text{g}/\text{cm}^2$	100 $\mu\text{g}/\text{cm}^2$	1 mg/kg
Dioxins	2.67 $\text{pg}/\text{cm}^2$	26.7 $\text{pg}/\text{cm}^2$	(1)

Note: (1) to be determined"

C325\ADDEN#2.ZK

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## **APPENDICES**

<b>Appendix A</b>	<b>Work Plan</b>
<b>Appendix B</b>	<b>Health and Safety Plan</b>

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<b>Figure 6</b>	<b>Wipe Sample Results - Summary</b>
<b>Figure 7</b>	<b>Building Area Designations</b>

**DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS**

The bidder agrees that its bid shall be good and may not be withdrawn for a period of 60 days, Saturdays, Sundays and legal holidays excluded, after the opening of the bids.

Litton Systems, Inc. reserves the right to waive any informalities, to accept or reject, in whole or in part any or all bids, or take whatever other action may be deemed to be in the best interest of Litton Systems, Inc.

**LITTON SYSTEMS, INC.**

**TED CRAVER  
STAFF VICE PRESIDENT**

**END OF SECTION**

C325\SPEC\00020 - 1/26/95

**INSTRUCTIONS TO BIDDERS**



**SECTION 00100****INSTRUCTION TO BIDDERS****A. PROPOSAL GUARANTY**

1. The proposal from the Contractor must be accompanied by cash, a certified check, treasurer's check or cashier's check issued by a responsible bank or trust company or a bid bond in the amount of five (5) percent of the bid price made payable to Litton Systems, Inc.

**B. FAILURE TO EXECUTE A CONTRACT**

1. Should the successful bidder fail to execute the Contract and/or to furnish the necessary Contract Bonds and insurance certificates as specified, within five days - Saturdays, Sundays and legal holidays excluded - of notice in writing to him by the Owner or agent that he is to be awarded the Contract, the Owner may at its option determine that the bidder has refused to execute a Contract with the Owner. Upon failure to execute a Contract within the above specified time period the bidder's Proposal Guaranty shall be forfeited to the Owner, and the Contract may then be offered to the next lowest responsible and eligible bidder.

**C. CONTRACT BONDS**

1. The successful bidder is to furnish to the Owner four (4) copies of a Performance and a Labor and Materials Payment Bond each in the amount of one hundred fifty percent (150%) of the Contract amount guaranteeing the faithful performance and full payment for all work required and for all labor and materials furnished under this Contract. The Contractor's attention is directed to Article 17 of the General Conditions. These bonds shall be subject to the approval of the Owner prior to the execution of the Contract.

**D. SITE VIEWING**

1. A prebid meeting is scheduled to be held at the site for February 2, 1995 at 10:00 AM CST. All bidders for the work are required under this Contract to visit the work site before bidding to fully acquaint themselves with the site, site access, site conditions, extent of the work and any difficulties in doing the work required and the costs related hereto shall be included in the Proposal for the work. Attendance at the Prebid is mandatory for bidding on the project.

**E. CONTRACT AWARD**

1. The Contract shall be awarded by Litton Systems, Inc. to the lowest responsible and eligible bidder. The term "lowest responsible and eligible bidder" shall mean the bidder whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work.

**F. SUBMITTALS**

Contractor shall submit the following information with their bid:

Note: If subcontractors are utilized, the Contractor shall submit the same information for the subcontractors as shown below (excluding bid security).

1. Bid Security
2. References for 3 similar projects (Names, Phone Numbers, and Project Values)
3. Bid Form
4. Insurance Coverages
5. Equipment List
6. Certified copy of Resolution of Board of Directors
7. Copies of licenses as specified (hazardous materials, etc.)
8. Project Approach Plan

**G. SEQUENCE OF EVENTS**

The Contractor is expected to perform the work according to the following sequence of events:

1. Mobilize on-site
2. Remove and stockpile existing litter
3. Perform various clean-up/wipe tests to determine the effectiveness of each clean-up method
4. Demolish and stockpile incinerators
5. Proceed with selective demolition and site clean-up as directed by the Engineer
6. Characterize waste stockpiles/dispose off-site
7. Assist the Engineer in Confirmatory Sampling

8. Complete project/demobilize

**H. SCHEDULE**

Contractor shall comply with the following schedule:

1. Specifications Available - January 26, 1995
2. Prebid on-site meeting - February 2, 1995 - 10 AM CST - Mandatory
3. Bids Due March 9, 1995 - 2:00 PM EST
4. Notice to Proceed - March 22, 1995
5. Start Project - April 5, 1995
6. Complete Cleanup and Demolition - April 19, 1995
7. Complete Waste Characterization/Disposal - June 21, 1995
8. Complete Confirmatory Sampling - June 28, 1995
9. Complete Analytical Results - July 20, 1995

**END OF SECTION**

C325\SPEC\00100 - 1/26/95

**BID FORMS**

SECTION 00300

BID FORM

PROPOSAL FOR:

Demolition and Site Remediation of the  
Lake Salvage Facility  
2527-29 West Lake Street  
Chicago, IL 60607

PROPOSAL TO:

Litton Systems, Inc.  
1725 Jefferson Davis Highway  
Suite 601, Crystal Square Two  
Arlington, VA 22202

Attn: Theodore F. Craver  
Staff Vice President

BID FORM: Central States Environmental Services, Inc.

(Print or Type Name of Bidder)

(A Corporation/~~A Partnership~~/~~An Individual~~/~~A Joint Venture~~)  
([Bidder to strike out inapplicable terms.])

The undersigned Bidder offers and agrees, if this Proposal is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Proposal and in accordance with the Contract Documents.

The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph, the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

In submitting this Proposal, Bidder represents, as more fully set forth in the agreement, that he has examined the Instructions to Bidders, all of the other Bidding Documents and all of the Contract Documents; that he has examined the actual site and locality where the Work is to be performed; that he has familiarized himself with the legal requirements (federal, state and local laws, ordinances, rules and regulations); that he has made such independent investigations as he deems necessary; and that he has satisfied himself as to all conditions affecting cost, progress or performance of the Work.

Bidder further agrees as follows: 1) that this Bid shall remain open and may not be withdrawn for a time period of 60 days from the bid due date. 2) that he accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of his bid security; 3) and that, upon acceptance of this Bid, he will execute the Agreement and will furnish the required contract security and insurance certificates within the time period(s) set forth in the Instructions to Bidders.

The approximate quantities of work to be performed under the proposed Agreement are set forth in the Bid Form and other portions of this specification. These quantities are to be considered as approximate only and are given solely for the comparison of Bids. The OWNER does not expressly or by implication agree that the actual amounts will correspond therewith, but reserves the right to increase or decrease the amount of any item or portion of the Work as may be deemed necessary by the ENGINEER. The CONTRACTOR shall at no time make claim for anticipated profit or loss of profits because of any difference between the quantities of work actually done, or of material actually furnished, and the estimated quantities. The CONTRACTOR will be paid only for the actual quantities of work performed at the Contract bid prices.

The Contractor shall price each item as Lump Sum or Unit Price, as stipulated. The OWNER will select from the following items in accordance with the most cost-effective proposal to perform the work described in this Project Manual. Bids will be compared in descending order of importance starting with the Base Bid Item 1 (1st) to Item 26 (last) or any combination, thereof. The following is a general description of each item.

In accordance with the above understandings and agreements, Bidder will complete the Work for the following sums:

(Amounts to be shown in both words and numerals. In case of discrepancy, amounts shown in words will govern.)

ITEM NO.	ESTIMATED QUANTITY	ITEM WITH UNIT BID PRICES WRITTEN IN WORDS & FIGURES	AMOUNT OF ITEM DOLLARS CENTS
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Base Bid

1	Lump Sum	For mobilization and demobilization of personnel, equipment and materials on-site to perform the work described in this Project Manual, site security, as well as work associated with the general clean-up of the site following the completion of all site activities, the sum of:
---	----------	--

(\$ 14,061.00) Lump Sum

\$ 14,061.00

ITEM NO.	ESTIMATED QUANTITY	ITEM WITH UNIT BID PRICES WRITTEN IN WORDS & FIGURES	AMOUNT OF ITEM DOLLARS CENTS
<u>Alternate 1 (ADD)</u>			
2	Lump Sum	For the demolition and stockpiling on-site of two incinerator structures, and stockpiling remaining ash material including all labor, materials and equipment, in place, the sum of:	
		<u>(\$ 19,806.00 ) Lump Sum</u>	<u>\$19,806.00</u>
<u>Alternate 2 (ADD)</u>			
3	20 c.y.	For the removal and stockpiling of existing litter to a designated area within the site, for later disposal to a lined landfill, including all labor, materials and equipment, the sum of:	
		<u>(\$ 163.24 ) per cubic yard</u>	<u>\$ 3,264.80</u>
<u>Alternate 3 (ADD)</u>			
4	15 c.y.	For the demolition and stockpiling of selected building structures for later disposal to a RCRA permitted TSDF, including all labor, materials and equipment, the sum of:	
		<u>(\$ 169.60 ) per cubic yard</u>	<u>\$ 2,544.00</u>
<u>Alternate 4 (ADD)</u>			
5	10 c.y.	For the demolition and stockpiling of designated building structures for later disposal to a demolition landfill, including all labor, materials and equipment, the sum of:	
		<u>(\$ 112.36 ) per cubic yard</u>	<u>\$ 1,123.60</u>

ITEM NO.	ESTIMATED QUANTITY	ITEM WITH UNIT BID PRICES WRITTEN IN WORDS & FIGURES	AMOUNT OF ITEM DOLLARS CENTS
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Alternate 5 (ADD)

6 Lump  
Sum

For sample collection and waste characterization of the various waste stock-piles generated during the process of the work, including all labor, materials and equipment, the sum of:

\$ 9,914.00

(\$ 9,914.00) Lump Sum

Alternate 6 (ADD)

7 15  
tons

For the loading, transportation and disposal of hazardous wastes generated during the demolition work to a RCRA permitted TSDF, including all labor, materials and equipment, the sum of:

\$ 5,278.80

(\$ 351.92 ) per each ton

Alternate 7 (ADD)

8 10  
tons

For the loading, transportation and disposal of demolition wastes to a demolition landfill, including all labor, materials and equipment, the sum of:

\$ 498.20

(\$ 49.82 ) per each ton

Alternate 8 (ADD)

9 500  
gallons

For the collection, segregation and disposal of liquid wastes generated during the demolition work for disposal at a POTW, including all labor, materials and equipment, the sum of:

\$ 1,270.00

(\$ 2.54 ) per each gallon



ITEM NO.	ESTIMATED QUANTITY	ITEM WITH UNIT BID PRICES WRITTEN IN WORDS & FIGURES	AMOUNT OF ITEM DOLLARS CENTS
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Alternate 9 (ADD)

10      10  
         tons

For the loading, transportation and disposal of site litter to a lined landfill, including all labor, materials and equipment, the sum of:

\$ 1,717.20

(\$ 171.72 ) per each ton

Alternate 10 (ADD)

11      21  
         wipe samples

For sample collection and laboratory analyses of dioxin, lead and PCBs wipe samples taken after the various clean-up tests, including all labor, materials and equipment, the sum of:

\$ 36,061.20

(\$ 1717.20 ) per each wipe sample

Alternate 11 (ADD)

12      2  
         tests

For providing all labor, materials and equipment necessary to perform a vacuum clean-up test on designated building structures and pavement areas at the site, the sum of:

\$ 515.16

(\$ 257.58 ) per each test

Alternate 12 (ADD)

13      2  
         tests

For providing all labor, materials and equipment necessary to perform a power wash clean-up test on designated building structures and pavement areas at the site, the sum of:

\$ 515.16

(\$ 257.58 ) per each test

ITEM NO.	ESTIMATED QUANTITY	ITEM WITH UNIT BID PRICES WRITTEN IN WORDS & FIGURES	AMOUNT OF ITEM DOLLARS CENTS
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Alternate 13 (ADD)

14      2  
         tests

For providing all labor, materials and equipment necessary to perform a chemical wash clean-up test on designated building structures and pavement areas at the site, the sum of:

(\$ 257.58 ) per each test

\$ 515.16

Alternate 14 (ADD)

15      1  
         test

For providing all labor, materials and equipment necessary to perform a scarification test on designated building structures and pavement areas at the site, the sum of:

(\$ 257.58 ) per each test

\$ 257.58

Alternate 15 (ADD)

16      20,000  
         s.f.

For providing all labor, materials and equipment necessary to decontaminate designated building structures and pavement areas at the site using the vacuum method, the sum of:

(\$ 0.89 ) per square foot

\$ 17,800.00

Alternate 16 (ADD)

17      12,000  
         s.f.

For providing all labor, materials and equipment necessary to decontaminate designated building structures and pavement areas at the site using the power wash method, the sum of:

(\$ 2.54 ) per square foot

\$ 30,480.00

ITEM NO.	ESTIMATED QUANTITY	ITEM WITH UNIT BID PRICES WRITTEN IN WORDS & FIGURES	AMOUNT OF ITEM DOLLARS CENTS
<u>Alternate 17 (ADD)</u>			
18	1,000 s.f.	For providing all labor, materials and equipment necessary to decontaminate designated building structures and pavement areas at the site using the chemical cleaning method, the sum of:	
		(\$ 3.55 ) per square foot	\$ 3,550.00
<u>Alternate 18 (ADD)</u>			
19	500 s.f.	For providing all labor, materials and equipment necessary to decontaminate designated building structures and pavement areas at the site using the scarification method, the sum of:	
		(\$ 4.35 ) per square foot	\$ 2,175.00
<u>Alternate 19 (ADD)</u>			
20	500 s.f.	For providing all labor, materials and equipment to encapsulate designated building structures and concrete pavement areas at the site, the sum of:	
		(\$ 4.35 ) per square foot	\$ 2,175.00
<u>Alternate 20 (ADD)</u>			
21	10 tons	For loading, transportation and disposal of liquid hazardous wastes generated as a result of the decontamination work to a RCRA permitted TSDF, including all labor, materials and equipment, the sum of:	
		(\$ 351.92 ) per each ton	\$ 3,519.20

ITEM NO.	ESTIMATED QUANTITY	ITEM WITH UNIT BID PRICES WRITTEN IN WORDS & FIGURES	AMOUNT OF ITEM DOLLARS CENTS
-------------	-----------------------	---	---------------------------------

Alternate 21 (ADD)

22      50  
         tons

For the excavation, stockpiling, loading  
and disposal of contaminated soil to a  
RCRA permitted TSDF, including all labor,  
materials and equipment, the sum of:

(\$ 270.30 ) per each ton

\$ 13,515.00

Alternate 22 (ADD)

23      100  
         l.f.

For the installation and repair of a  
permanent chain link fence, including  
all labor, materials and equipment,  
the sum of:

(\$ 34.98 ) per linear foot

\$ 3,498.00

Alternate 23 (ADD)

24      25  
         c.y.

For the delivery of borrow to the site,  
including all labor, materials and  
equipment, the sum of:

(\$ 29.36 ) per cubic yard

\$ 1,468.00

Alternate 24 (ADD)

25      5  
         c.y.

For the delivery of topsoil to the  
site, including all labor, materials  
and equipment in place, the sum of:

(\$ 28.14 ) per cubic yard

\$ 140.70

ITEM NO.	ESTIMATED QUANTITY	ITEM WITH UNIT BID PRICES WRITTEN IN WORDS & FIGURES	AMOUNT OF ITEM DOLLARS CENTS
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Alternate 25 (ADD)

26	500 s.f.	For providing all labor, materials and equipment to seed areas disturbed as a result of soil excavations, the sum of:	
		(\$ 0.095 ) per square foot	\$ 47.50

TOTAL AMOUNT OF BID [ITEMS 1 (BASE BID) THROUGH 26]			\$ 175,710.26
--	--	--	---------------

This bid is based upon the analysis found in the Project Manual issued by Tighe & Bond, Inc. The disposal cost for the hazardous material is based upon a D008 (lead) classification. The disposal cost for the water is based upon disposal into a POTW. In the event these wastes are reclassified then the contractor shall have the opportunity to rebid the disposal portion of this bid.

Bidder agrees that the work will be substantially completed and completed on or before the dates or within the number of days indicated in the Agreement. Bidder accepts the provisions of the Agreement as to liquidated and special damages in the event of failure to substantially complete the Work on time.

Bidder acknowledges receipt of the Addenda listed below and further acknowledges that the provisions of each Addendum have been included in the preparation of his Bid.

<u>Addendum No.</u>	<u>Date Received</u>	<u>Addendum No.</u>	<u>Date Received</u>
<u>#1</u>	<u>Feb 3, 1995</u>	<u>                    </u>	<u>                    </u>
<u>#2</u>	<u>Mar 7, 1995</u>	<u>                    </u>	<u>                    </u>

The following documents are attached to and made a condition of this Bid.

Note: Includes same information for any subcontractor proposed for project (excluding bid security).

1. Bid security in the amount of Ten Thousand Dollars (\$ 10,000.00 ), consisting of a bond in the amount of five percent of the bid.
2. Certified Copy of Resolution of Board of Directors (if corporation).
3. Job References - At least 3 with names, phone numbers and project values.
4. Insurance Coverages.
5. Equipment List.
6. Resolution of Board of Directors.
7. Form of statement of Bidder's Qualifications (Section 00420).
8. Copies of All Licenses.
9. Project Approach Plan (Sections 02070 and 02080).

The terms used in this Bid, which are defined in the General and Supplementary Conditions, have the meanings assigned to them in the General and Supplementary Conditions. The bid shall be valid for 60 days from the bid opening. No bids will be allowed to be withdrawn in that time period.

Respectfully submitted on March 7, 1995.

If BIDDER is:

An Individual

By N/A  
(Individual's Signature)

\_\_\_\_\_  
(Printed or Typed Name of Individual)

Doing Business as \_\_\_\_\_

License or Registration Number: \_\_\_\_\_

Business Address: \_\_\_\_\_

\_\_\_\_\_  
Phone No.: \_\_\_\_\_

A Partnership

By N/A  
(Firm's Name)

By \_\_\_\_\_  
(Partner's Signature)

\_\_\_\_\_  
(Printed or Typed Name and Title of Partner)

License or Registration Number: \_\_\_\_\_

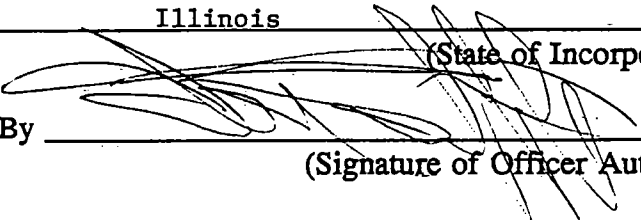
Business Address: \_\_\_\_\_

\_\_\_\_\_  
Phone No.: \_\_\_\_\_

A Corporation

By Central States Environmental Services, Inc.  
(Corporation's Name)

Illinois  
(State of Incorporation)

By   
(Signature of Officer Authorized to Sign)

Elvin Copple, President  
(Printed or Typed Name and Title of Officer Authorized to Sign)

(CORPORATE SEAL)

Attest Thammie Taylor  
(Secretary)

License or Registration Number: D 5460-620-6

Business Address: 609 Airport Road

Centralia, IL 62801

Phone No.: 618-532-4784



Central States Environmental Services, Inc., proposes the attached alternate bid for the Lake Salvage Facility demolition and site remediation. This proposal is to demolish all the building structures and leave nothing standing. And then clean the floors to site clean-up thresholds. This will eliminate future liability for removal of building structures or injury due to collapse of deteriorating building structures.

Although this total is higher than the cleaning and demolition of the site, we feel the total removal of building structures would remove the possibility of future environmental clean up and/or disposal problems under more stringent regulations.

This bid is based upon the analysis found in the Project Manual issued by Tighe & Bond, Inc. The disposal cost for the hazardous material is based upon a D008 (lead) classification. The disposal cost for the water is based upon disposal into a POTW. In the event these wastes are reclassified then the contractor shall have the opportunity to rebid the disposal portion of this bid.

## LAKE SALVAGE FACILITY -- DEMO AND SITE REMEDIATION

### TOTAL BUILDING STRUCTURE DEMOLITION

<u>Item No</u>	<u>Description</u>	<u>Amount</u>	<u>Unit</u>	<u>Unit Cos</u> (\$/unit)	<u>Cost</u>
1	Mob/Demob	Lump Sum	LS		\$14,061.00
2	Demo, stk pl incin/ash	Lump Sum	LS		\$19,806.00
3	Remov stk pl litter/debris	20	C. Y.	\$163.24	\$3,264.80
4	Demo bldg, stk pl/disp RCRA TSDF	15	C. Y.	\$169.60	\$2,544.00
5	Demo bldg, stk pl/disp landfill	290	C. Y.	\$112.36	\$32,584.40
6	Sampl coll/wast charac	Lump Sum	LS		\$9,914.00
7	LTD haz wst to RCRA TSDF	15	Tons	\$351.92	\$5,278.80
8	LTD demo wst to land fill	290	Tons	\$49.82	\$14,447.80
9	CSD liq wst to POTW	500	Gallons	\$2.54	\$1,270.00
10	LTD litter/debris to lined land fill	10	Tons	\$171.72	\$1,717.20
11	Confirm testing dioxin/lead	21	Wipe samples	\$1,717.20	\$36,061.20
12	Vacuum clean-up surface test	2	Test	\$257.58	\$515.16
13	Power wash clean-up surface test	2	Test	\$257.58	\$515.16
14	Chemical wash clean-up surface te	2	Test	\$257.58	\$515.16
15	Scarification surface clean-up test	1	Test	\$257.58	\$257.58
16	Vacuum decon bldg struct/floor	15000	S. F.	\$0.89	\$13,350.00
17	Power wash decon bldg struct/floor	5000	S. F.	\$2.54	\$12,700.00
18	Chem clean decon bldg struct/floor	0	S. F.	\$3.55	\$0.00

19	Scarif decon bldg struct/floor	0 S. F.	\$4.35	\$0.00
20	Encapsulate bldg struct/floor	0 S. F.	\$4.35	\$0.00
21	LTD haz wst due to decon	0 Tons	\$351.92	\$0.00
22	Excav/stk pl/disposal of soil	50 Tons	\$270.30	\$13,515.00
23	Install/repair chain link fence	100 L. F.	\$34.98	\$3,498.00
24	Delivery of borrow	50 C. Y.	\$29.36	\$1,468.00
25	Delivery of topsoil	5 C. Y.	\$28.14	\$140.70
26	Seed excavated soils	500 S. F.	\$0.10	\$47.50

TOTAL BID

\$187,471.46

**FORM OF STATEMENT OF BIDDER'S QUALIFICATIONS**

**FORM OF STATEMENT OF BIDDER'S QUALIFICATIONS**

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he desires.

1. Name of Bidder Central States Environmental Services, Inc.
2. Permanent main office address, including zip code.  
609 Airport Road  
P.O. Box 684  
Centralia, IL 62801
3. When organized March 27, 1987
4. How many years have you been engaged in the contracting business under your present firm or trade name? 8 years
5. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion.)  
Illinois Central Railroad - \$1,500,000.00 5/95
6. General character of work performed by your company.  
Hazardous waste remediation and transportation
7. Have you ever failed to complete any work awarded to you? If so where and why?  
No
8. Have you ever defaulted on a contract? No
9. List the more important projects recently completed by your company, stating the approximate cost for each, and the month and year completed.  
ComCast, Inc. - Meridian Plaza, Philadelphia, PA \$2,100,000.00 1/95  
Illinois Central Railroad - Thompsonville, IL \$1,500,000.00 5/95  
Star Station - LUST Removal \$450,000.00 8/94

10. List your major equipment available for this contract and as identified in Section 2.13 of the Plan.

See Section of Portfolio

11. Experience in demolition/remediation work similar in importance to this project.

State of Illinois demolition of houses/  
Village of Maywood - American Can Site

12. Background and experience of the principal members of your organization, including the officers.

See Section of Portfolio

13. Credit Available: \$ 1,000,000

14. Give bank reference: Magna Bank of Illinois

15. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the City of Chicopee? yes

16. The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the City of Chicopee in verification of this Statement of the Bidder's Qualifications.

Dated at Centralia, IL this 8<sup>th</sup>

day of March, 19 95

Central States Environmental Services, Inc.  
(Name of Bidder)

By 

Title President

State of Illinois

)  
)ss.

County of Marion

)  
)

Elvin Copple, being duly sworn,

deposes and says that he is President of

Central States Environmental Services, Inc.  
(Name of Organization)

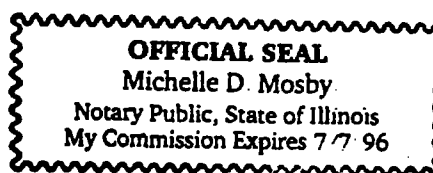
and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn to before me this

8<sup>th</sup> day of March, 19 95  
Michelle D. Mosby  
(Notary Public)

My commission expires 7-7-96

C325\SPEC\00350 - 1/11/95



## RESOLUTION

At a special meeting of the Board of Directors of Central States Environmental Services, Inc. held this 7th day of March, 1995, all directors present and waiving notice, the following proposition was thoroughly discussed by all members of the Board of Directors:


"Is it in the Corporation's best interest to submit a bid to Litton Industries for remediation of their Lake Salvage Facility?"

After discussion, the Board of Directors find:

BE IT RESOLVED that it is in the best interest of the Corporation to submit a bid to Litton Industries in the amount of \$175,710.<sup>26</sup> to remediate their Lake Salvage Facility pursuant to specifications issued January, 1995.

There being no further business to come before the Board, the meeting adjourned.

DATED this 7th day of March, 1995.

  
Secretary



**AGREEMENT FORMS**

## SECTION 00500

## AGREEMENT

This Agreement, made this 31st day of March 1995 by and between Litton Systems, Inc., hereinafter called "Owner" and Central Sites Environmental Services, Inc. doing business as Contractor hereinafter called "Contractor".

Witnesseth: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will commence and complete the Demolition and Site Remediation of the Lake Salvage Facility 2527-29 West Lake Street, Chicago, Illinois.
2. The Contractor will furnish all of the material, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the project described herein.
3. The Contractor will commence the work required by the Contract Documents on or before the date specified in the Notice to Proceed and will complete the same including satisfactory completion of all performance testing within one hundred forty (140) calendar days from the date of the Notice to Proceed, unless the period for completion is extended otherwise by the Contract Documents. Liquidated damages in the amount of \$500 per day shall be paid to the Owner for each calendar day beyond the specified completion period that the work remains uncompleted.
4. The Contractor agrees to perform all of the work described in the Contract Documents and comply with the terms therein for the sum indicated on the Bid Form.
5. The term "Contract Documents" means and includes the following:
  - a. Instruction to Bidders
  - b. Bid Form
  - c. Bid Security
  - d. Agreement
  - e. General Conditions
  - f. Supplementary Conditions
  - g. Technical Specifications

- h. Notice of Award
- i. Notice to Proceed
- j. Change Orders
- k. Drawings prepared by Tighe & Bond, Inc. numbered Figures 1 through 7 and dated December 1994.
- l. Addenda:
  - No. 1 dated 1/31/95
  - No. 2 dated 3/7/95
  - No. \_\_\_\_\_ dated \_\_\_\_\_
  - No. \_\_\_\_\_ dated \_\_\_\_\_
  - No. \_\_\_\_\_ dated \_\_\_\_\_
- 6. The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions such amounts as required by the Contract Documents.
- 7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.
- 8. Retention from progress payments will be made in accordance with the General Conditions.

In witness whereof, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in 5 copies each of which shall be deemed an original on the date first above written.

Owner:

LITTON SYSTEMS, INC.

Attest:

*Kay T. Connelley*

By: *Theodore F. Craver*

Name: Theodore F. Craver

Staff Vice President; Director of

Title: Trade Regulations and Environ. Affairs

Contractor:

Attest:

*Tammie Taylor*

By: *Elvin Copple*

Name: Elvin Copple

Title: President

END OF SECTION

C325\SPEC\00500 - 1/27/95

**PERFORMANCE BOND**

**PERFORMANCE BOND**

**KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned**

\_\_\_\_\_, as Principal  
(Name and Address of Contractor)

("Principal"), and \_\_\_\_\_  
(Name and Address of Surety)

\_\_\_\_\_ of  
a corporation duly organized and existing under the laws of the \_\_\_\_\_, as Surety (the "Surety"), are held and firmly bound unto  
Litton Systems, Inc., as OBLIGEE (the "OBLIGEE"), a body existing under and by virtue  
of the laws of the State of Illinois, as hereinafter set forth, in the full and just sum of  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_.), lawful money of the United States of  
America, for the payment of which sum well and truly to be made, the said Principal and  
the said Surety bind ourselves, our heirs, executors, administrator, successors and assigns,  
jointly and severally, firmly by these presents.

**WITNESSETH THAT:**

WHEREAS, The Principal heretofore has submitted to the OBLIGEE a certain  
Proposal, dated \_\_\_\_\_, 19\_\_ (the "Proposal"), to perform  
certain Work for the OBLIGEE, in connection with Demolition and Site Remediation of the  
Lake Salvage Facility, pursuant to Drawings, Specifications and other related documents  
constituting the Contract Documents, which are incorporated into the Proposal by reference  
(the "Contract Documents"), as prepared by Tighe & Bond, the ENGINEER; and

WHEREAS, it also is a condition of the Contract Documents that this Bond be  
furnished by the Principal to the OBLIGEE; and

WHEREAS, Under the Contract Documents, it is provided, inter alia, that if the  
Principal shall furnish this Bond to the OBLIGEE, and if the OBLIGEE shall make an award  
to the Principal in accordance with the Proposal, then the Principal and the OBLIGEE shall  
enter into an Agreement with respect to performance of such Work (the "Contract"), and the  
form of Agreement as set forth in the Contract Documents.

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if:  
(a) the Principal well, truly and faithfully shall comply with and shall perform the Contract  
in accordance with the Contract Documents, at the time and in the manner provided in the  
Agreement and in the Contract Documents, and if the Principal shall satisfy all claims and  
demands incurred in or related to the performance of the Contract by the Principal or  
growing out of performance of the Contract by the Principal, and if the Principal shall

indemnify completely and shall save harmless the OBLIGEE and all of its officers, agents and employees, from any and all costs and damages which the OBLIGEE and all of its officers, agents and employees may sustain or suffer by reason of the failure of the Principal to do so, and if the Principal shall reimburse completely and shall pay to the OBLIGEE any and all costs and expenses which the OBLIGEE and all of its officers, agents and employees may incur by reason of any such default or failure of the Principal; and (b) if the Principal shall remedy, without cost to the OBLIGEE, all defects which may develop during the period of one year from the date of completion by the Principal and of final acceptance by the OBLIGEE of the Work to be performed under the Contract in accordance with the Contract Documents, which defects in the sole judgement of the OBLIGEE or its legal successors in interest shall be caused by or shall result from defective or inferior materials or workmanship, then this Bond shall be void; otherwise, this Bond shall be and shall remain in force and effect.

The Principal and the Surety agree that any alterations, changes and/or additions to the Contract Documents, and/or any alterations, changes and/or additions to the Work to be performed under the Contract in accordance with the Contract Documents, and/or any alterations, changes and/or additions to the Contract, and/or any giving by the OBLIGEE of any extensions of time for the performance of the Contract in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the OBLIGEE toward the other with respect to the Contract Documents and the Contract, and/or the reduction of any percentage to be retained by the OBLIGEE as permitted by the Contract Documents and by the Contract, shall not release, in any manner whatsoever, the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors and assigns, from liability and obligations under this Bond; and the Surety, for value received, does waive notice of any such alterations, changes, additions, extensions of time, acts of forbearance and/or reduction of retained percentage.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_.

------(Individual Principal)-----

By \_\_\_\_\_  
(Individual's Signature)

\_\_\_\_\_  
(Printed or Typed Name of Individual)

Doing business as \_\_\_\_\_

\_\_\_\_\_

------(Partnership Principal)-----

By \_\_\_\_\_  
(Firm's Name)

By \_\_\_\_\_  
(Partner's Signature)

\_\_\_\_\_  
(Printed or Typed Name of Partner)

------(Corporate Principal)-----

By \_\_\_\_\_  
(Corporation's Name)

\_\_\_\_\_  
(State of Incorporation)

By \_\_\_\_\_  
(Signature of Officer Authorized to Sign)

\_\_\_\_\_  
(Printed or Typed Name and Title of Officer Authorized to Sign)

(CORPORATE SEAL)

Attest \_\_\_\_\_  
(Secretary)

------(Joint Venture Principals)-----

By \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed or Typed Name)

By \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed or Typed Name)



(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above).

------(Corporate Surety)-----

By \_\_\_\_\_  
(Corporation's Name)

By \_\_\_\_\_  
(Signature of Officer or Attorney-in-Fact\*)

\_\_\_\_\_  
(Printed or Typed Name and Title of Officer, or Name of  
Attorney-In-Fact\*)

(CORPORATE SEAL)

Attest \_\_\_\_\_  
(Secretary)

\*Attach certified and effective dated copy of power of attorney showing authority of attorney-in-fact to execute on behalf of corporation.

END OF SECTION

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**LABOR AND MATERIALS PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

\_\_\_\_\_  
(Name and Address of Contractor)

as Principal, (the "Principal"), and \_\_\_\_\_

\_\_\_\_\_  
(Name and Address of Surety)

\_\_\_\_\_ a corporation duly organized and existing under the laws of the \_\_\_\_\_ of \_\_\_\_\_ as Surety (the "Surety"), are held and firmly bound unto Litton Systems, Inc., as OBLIGEE (the "OBLIGEE"), as hereinafter setforth, in the full and just sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), lawful money of the United States of America, for the payment of which sum well and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

**WITNESSETH THAT:**

WHEREAS, the Principal heretofore has submitted to the OBLIGEE a certain Proposal, dated \_\_\_\_\_, 199\_\_ (the "Proposal"), to perform certain Work for the OBLIGEE, in connection with the Demolition and Site Remediation of the Lake Salvage Facility, pursuant to Drawings, specifications and other related documents constituting the Contract Documents, which are incorporated into the Proposal by reference (the "Contract Documents"), as prepared by Tighe & Bond, the ENGINEER; and

WHEREAS, it also is a condition of the Contract Documents that this Bond be furnished by the Principal to the OBLIGEE; and

WHEREAS, Under the Contract Documents, it is provided, inter alia, that if the Principal shall furnish this Bond to the OBLIGEE, and if the OBLIGEE shall make an award to the Principal in accordance with the Proposal, then the Principal and the OBLIGEE shall enter into an Agreement with respect to performance of such Work (the "Contract"), and the form of Agreement as set forth in the Contract Documents.

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if: (a) the Principal well, truly and faithfully shall comply with and shall perform the Contract in accordance with the Contract Documents, at the time and in the manner provided in the Agreement and in the Contract Documents, and if the Principal shall satisfy all claims and

demands incurred in or related to the performance of the Contract by the Principal or growing out of performance of the Contract by the Principal, and if the Principal shall indemnify completely and shall save harmless the OBLIGEE and all of its officers, agents and employees, from any and all costs and damages which the OBLIGEE and all of its officers, agents and employees may sustain or suffer by reason of the failure of the Principal to do so, and if the Principal shall reimburse completely and shall pay to the OBLIGEE any and all costs and expenses which the OBLIGEE and all of its officers, agents and employees may incur by reason of any such default or failure of the Principal; and (b) if the Principal shall remedy, without cost to the OBLIGEE, all defects which may develop during the period of one year from the date of completion by the Principal and of final acceptance by the OBLIGEE of the Work to be performed under the Contract in accordance with the Contract Documents, which defects in the sole judgement of the OBLIGEE or its legal successors in interest shall be caused by or shall result from defective or inferior materials or workmanship, then this Bond shall be void; otherwise, this Bond shall be and shall remain in force and effect.

The Principal and the Surety agree that any alterations, changes and/or additions to the Contract Documents, and/or any alterations, changes and/or additions to the Work to be performed under the Contract in accordance with the Contract Documents, and/or any giving by the OBLIGEE of any extensions of time for the performance of the Contract in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the OBLIGEE toward the other with respect to the Contract Documents and the Contract, and/or the reduction of any percentage to be retained by the OBLIGEE as permitted by the Contract Documents and by the Contract, shall not release, in any manner whatsoever, the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors and assigns, from liability and obligations under this Bond; and the Surety, for value received, does waive notice of any such alterations, changes, additions, extensions of time, acts of forbearance and/or reduction of retained percentage.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on this \_\_\_\_ day of \_\_\_\_\_, 199 \_\_\_\_.

------(Individual Principal)-----

By \_\_\_\_\_  
(Individual's Signature)

\_\_\_\_\_  
(Printed or Typed Name of Individual)

Doing business as \_\_\_\_\_

------(Partnership Principal)-----

By \_\_\_\_\_  
(Firm's Name)

By \_\_\_\_\_  
(Partner's Signature)

\_\_\_\_\_  
(Printed or Typed Name of Partner)

------(Corporate Principal)-----

By \_\_\_\_\_  
(Corporation's Name)

\_\_\_\_\_  
(State of Incorporation)

By \_\_\_\_\_  
(Signature of Officer Authorized to Sign)

\_\_\_\_\_  
(Printed or Typed Name and Title of Officer Authorized to Sign)

(CORPORATE SEAL)

Attest \_\_\_\_\_  
(Secretary)

------(Joint Venture Principals)-----

By \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed or Typed Name)

By \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed or Typed Name)

(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above.)

------(Corporate Surety)-----

By \_\_\_\_\_  
(Corporation's Name)

By \_\_\_\_\_  
(Signature of Officer or Attorney-in-Fact\*)

\_\_\_\_\_  
(Printed or Typed Name and Title of Officer, or Name of Attorney-in-Fact\*)

(CORPORATE SEAL)

Attest \_\_\_\_\_  
(Secretary)

\*Attach certified and effective dated copy of power of attorney showing authority of attorney-in-fact to execute in behalf of corporation.

END OF SECTION

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GENERAL CONDITIONS

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SECTION 00700GENERAL CONDITIONSDEFINITION OF TERMSArticle 1. Definition of Terms

Wherever in these Specifications or other Contractual Documents the following terms, or pronouns in place of them, are used, the intent and meaning shall be interpreted as follows:

- |                      |   |   |
|----------------------|---|---|
| <u>Addendum</u>      | - | An addition to or alteration of the Plans and/or Specifications generally issued for clarification purposes prior to the opening of Proposals.  |
| <u>Advertisement</u> | - | The notice published in newspapers and trade bulletins announcing the time and place for the opening of bids for work to be done.   |
| <u>A.A.S.H.T.O.</u>  | - | The American Association of State Highway and Transportation Officials.   |
| <u>Alteration</u>    | - | Change in the form or character of any of the work done or to be done.  |
| <u>A.S.T.M.</u>      | - | The American Society for Testing Materials.   |
| <u>Bidder</u>        | - | Any individual, firm or corporation submitting a Proposal for the work contemplated, acting directly or through a duly authorized representative.   |
| <u>Contract</u>      | - | A written agreement executed by the parties thereto for the construction, reconstruction, alteration, remodeling, repair, demolition, improvement or development of any building, structure, addition, facility, system, or pipeline. |
| <u>Contractor</u>    | - | A party to the Contract, acting directly or through an authorized lawful agent or employee.   |
| <u>Engineer</u>      | - | The Consulting Engineer acting directly or through an authorized representative, such representative acting within the scope of the particular duties entrusted to him.   |
| <u>Extra Work</u>    | - | Work or materials not called for in the Plans and Specifications and which is deemed necessary and authorized by the Engineer.  |

- Layout - See Right of Way.
- Location - See Right of Way.
- Lump Sum Contract - One in which the Proposal is a fixed price; inclusion of alternates requested by the Owner for variations in the scope of the work does not modify or rescind this definition.
- Material - Any article, assembly, system, or any component part thereof.
- Owner - The Contracting or the Awarding Authority.
- Plans - The Contract Drawings, detail sheets, or exact reproductions thereof, which show the location, character, dimension and details of the work including any alterations thereof permissible under the Contract and authorized by duly approved written orders.
- Proposal - The written offer of the Bidder submitted in approved form to perform the work contemplated under the Contract.
- Project - The purpose for which bids have been called and work contracted for.
- Right of Way - That area which has been laid out or acquired for the purpose of this project.
- Supplementary Conditions - The special directions, provisions and requirements prepared to cover Contract requirements or work not satisfactorily provided for by these General Conditions. These Supplementary Conditions shall be included within the general term "Specifications" and shall be made a part of the Contract with the express purpose that they shall prevail over all other Specifications.
- Specifications - The directions, provisions and requirements, designated as Specifications, together with all written agreements made or to be made pertaining to the method and manner of performing the work, or the quantities and qualities of materials to be furnished under the Contract. The Specifications shall include the Advertisement, Instruction to Bidders, Bid Form, General Conditions, Standard Detail Drawings, Supplementary Conditions, Technical Specifications, Addenda and Agreement Form.

Subcontractor

- (a) For contracts awarded pursuant to sections 44A to 44L of Chapter 149, a person who files a sub-bid and receives a contract as a result of filing sub-bid or who is approved by the Owner in writing as a person performing labor or both performing labor and furnishing labor pursuant to a Contract with the General Contractor.
- (b) A person approved by the Awarding Authority in writing as a person performing labor or both performing labor and furnishing labor pursuant to a Contract with the General Contractor.
- (c) For contracts with the Commonwealth of Massachusetts not awarded as provided in rules 44A to 44L, inclusive, of Chapter 149, a person contracting with the General Contractor to supply materials used or employed in a public works project for a price in excess of five thousand dollars.

Unit Price Contract

- One in which the Proposal is based on unit bid prices and estimated quantities; payment is based on field measurement of actual quantities completed or constructed.

Work

- All performance, including the furnishing of materials, labor, tools, equipment and incidentals, required of the Contractor under the terms of the Contract.

The Words

- "As directed", "as permitted", "as required", or words of like effect shall mean that the direction, permission or requirement of the Engineer is intended, and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean approved by or acceptable or satisfactory to the Engineer, unless otherwise provided herein. The words "necessary", "suitable", "equal", or words of like import shall mean necessary, suitable or equal in the opinion of the Engineer.

The words "approval of the Owner" or "approval by the Owner" shall mean approval either by vote of or in writing by the duly authorized officials.

Written Notice

- Shall be deemed to have been duly served if delivered in person to the individual, or to a member of the firm or to an officer of the Corporation for whom it is intended, or if delivered at or sent by certified mail - return receipt requested to the last business address known to him who gives the notice.

PROPOSAL REQUIREMENTS AND CONDITIONSArticle 2.      Contents of Proposal Forms

Two sets of Proposal Forms consisting of the documents listed below will be furnished by the Owner to each general bidder upon request at the office of the Engineer. One set of said proposed forms consisting of the documents listed below will be furnished by the Owner to each sub-bidder upon request at the office of the Engineer. These proposed forms will be available without cost or charge except for a deposit for return of same in good condition.

- A.      The Specifications; including the Advertisement, Instruction to Bidders, General Conditions, Supplementary Conditions, Technical Specifications, Standard Detail Drawings, Addenda, Bid Form and Agreement Form.
- B.      The Plans.

Article 3.      Interpretation of Basic Estimates of Quantities for Unit Price Contracts

- A.      All bids will be compared on the basis of the Engineer's estimate of quantities of work to be done, as shown in the Proposal.

These quantities are approximate only, being given as a basis for the comparison of bids, and the Owner does not expressly or by implication agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class, item or portion of the work, as may be deemed necessary or expedient by the Owner.

Bidders are required to submit their estimate upon the following express conditions, which shall apply to and become part of every bid received, viz:

An increase or decrease in the quantity for any item or group of items shall be not regarded as cause for an increase or decrease in the prices, nor in the time allowed for the completion of the work, except as provided in the Contract. An increase or decrease in the quantity of work to be done shall not warrant any claim for loss, damage, or anticipated profit.

- B.      The work has been divided into classes and items in order to enable the bidder to bid on the different portions of the work in accordance with his estimate of their cost, so that in the event of an increase or decrease in the quantities of any particular class of work the actual quantities of any particular class of work the actual quantities executed may be paid for at the price bid for that particular class of work.

Article 4. Examination of Plans and the Location

Statements as to the condition under which the work is to be performed, including plans, surveys, measurements, dimensions, calculations, estimates, borings, etc., are made solely to furnish a basis for comparison of bids, and the Owner does not guarantee that they are even approximately correctly. This material represents the best factual information available to the Owner and is made available without the assumption of responsibility for its accuracy. The Contractor must satisfy himself by his own investigation and research regarding all conditions affecting the work to be done and labor and material needed, and make his bid in sole reliance thereon. The Contractor should carefully examine any materials furnished by the Owner, the location of the work, the difficulties to be encountered in doing the work, and all other factors relating to the project.

No allowance will be made, and no responsibility will be assumed, by the Owner for any failure of the Contractor to estimate correctly any difficulty attending the execution of the work.

In regard to subsurface soil conditions, the provisions of Chapter 30, Section 39N of the Mass. General Laws (recited hereinafter) will prevail in every Contract subject to Section 39M of Chapter 30 or Section 44A of Chapter 149.

"If, during the progress of the work, the Contractor or the awarding authority discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the contract documents, either the Contractor or the contracting authority may request an equitable adjustment in the contract price of the contract applying to work affected by the differing site conditions. A request for such adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a Contractor, or upon its own initiative, the contracting authority shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the contract documents or from those ordinarily encountered and generally recognized as inherent in work of the character provide for in the plans and contract documents and are of such a nature as to cause an increase or decrease in the cost of performance of the work or a change in the construction methods required for the performance of the work which results in an increase or decrease in the cost of the work, the contracting authority shall make an equitable adjustment in the contract price and the contract shall be modified in writing accordingly."

Article 5. Preparation of ProposalsA. Proposal Prices for Lump Sum Contract

Each general bid and each sub-bid shall be submitted upon a form furnished by the Owner. All words and figures shall be in ink. In case of discrepancy between the written words and the written figures, the written words shall govern.

The bidder shall specify his price, in both words and figures, written in the space provided for that purpose, and the total amount of the Proposal obtained by adding the amounts of the item(s). Incomplete or conditional Proposals will be rejected.

B. Proposal Prices for Unit Price Contract

Each general bid shall be submitted upon a form furnished by the Owner. All words and figures shall be in ink. In case of discrepancy between the unit prices and the extended totals, the unit prices shall govern.

The bidder shall specify a unit price, in both words and figures, for each and every item for which a quantity is given, and shall also show the products of the respective unit prices and quantities, written in figures in the column provided for that purpose, and the total amount of the Proposal obtained by adding the amounts of the several items. In case of discrepancy between the unit prices and the extended totals, the unit prices shall govern. No bid will be accepted which does not contain a unit price for every item shown on the Proposal Form. No conditional bids will be accepted.

C. General

When an item in the Proposal contains a choice to be made by the bidder, the bidder shall indicate his choice in accordance with the Specifications for that particular item, and thereafter no further choice will be permitted without permission from the Owner.

The price for any item, bid and/or contracted for, unless otherwise noted or specified shall include full compensation for all materials, equipment, tools, labor and incidental work, necessary to complete the item to the satisfaction of the Engineer. The prices shall, without exception, include all royalties and costs arising from patents, trademarks, and copyrights in any way involved in the work.

D. Signatures

All Proposals shall be signed correctly with ink in the proper places provided, as follows:

If the Proposal is made by an individual, his name and post office address shall be given.

If the Proposal is made by a firm, partnership or corporation, it shall be signed by a person having such legal authority from the said firm, partnership or corporation and the person so signing the Proposal shall give his own name and title (if any) in addition to the name and address of the firm, partnership or corporation.

If the Proposal is made by a firm or partnership, the names and addresses of the individual members shall be given.

If the Proposal is made by a corporation, the name of the State under the laws of which the corporation was chartered and the names, titles and business addresses of the President, Treasurer and Manager and a certificate of vote granting authority to make such Proposal shall be given.

If the Proposal is made by a foreign corporation, it must comply with the provisions of Chapter 181 of the Massachusetts General Laws and any amendments thereto.

Article 6.      Delivery of Proposals

Each Proposal shall be submitted to the Owner in a sealed envelope. On the outside of the envelope shall be written the bidder's name and address and the name of and description of the project for which the bid is submitted. If the Proposal being submitted is for a sub-bid, the type of work involved and the item number shall be included.

If forwarded by mail, the sealed envelope containing the Proposal, and marked as directed above, must be enclosed in another envelope addressed to the Owner. The recommended method of mailing shall be "Certified Mail - Return Receipt Requested".

Proposals received by the Owner at the designated place after the time designated in the Advertisement for Bidders, or Proposals received at other than the designated place will be returned to the bidder unopened. It is the bidder's responsibility to see that his Proposal is at the designated place at the designated time.

Article 7.      Proposal Guaranty Required

In order to ensure the faithful fulfillment of its terms, each proposal shall be accompanied by cash, certified check, bank check or lawful money or a bond from an approved surety in an amount as specified in the Supplementary Conditions. Said check will be returned to the bidder unless retained by the Owner under the conditions hereinafter stipulated.

**Article 8. Public Opening of Proposals**

Proposals will be publicly opened and read aloud at the time and place indicated in the Advertisement for Bidders. Bidders or their authorized agents are invited to be present.

**Article 9. Rejection of Proposals**

Proposals which fail to meet the requirements of Articles 5, 6, and 7, or which are incomplete, conditional, or obscure, or which contain additions not called for, erasures, alterations, or irregularities of any kind, or in which errors occur, or which contain abnormally high or abnormally low bid prices for any class or item of work, may be rejected as informal. The Owner may waive any informalities in or reject any or all bids and may accept any bid the Owner deems to be in his best interests or in the best interests of the group represented by the Owner.

More than one Proposal from the same bidder, whether or not the same or different names appear on the signature page, will not be considered. Reasonable proof for believing that any bidder is so interested in more than one Proposal for the work contemplated will cause the rejection of all Proposals made by him directly or indirectly. Any or all Proposals will be rejected if there is reason for believing that collusion exists among the bidders.

Bidders whose Proposals have been rejected because of evidence of collusion as specified in Article 9 will not be considered in future Proposals for the same work, and such bidders may be disqualified from bidding on future work.

**Article 10. Withdrawal of Proposals**

Any bid may be withdrawn prior to the scheduled time for opening as shown in the Special Provisions or authorized postponements thereof.

After the bid opening no bidder may withdraw his Proposal within thirty (30) days except for those situations wherein the award of the Contract requires approval by an officer, board or agency of the Federal Government; in such situations no bidder may withdraw his Proposal until thirty (30) days after such approval by an officer, board or agency of the Federal Government.

**Article 11. Competency of Bidders**

No Contract will be awarded except to reasonable bidders capable of performing the class of work contemplated. Before the award of the Contract, any bidder may be required to show that he has the necessary facilities, experience, ability and financial resources to perform the work in a satisfactory manner and within the time stipulated. If the Contract contains special work of a complicated nature or if it contains items for materials or work the character of which will depend upon the Contractor's skill or experience, he will be required to show proof that he has a satisfactory record of similar



work performed or materials furnished under other Contracts. Bidders may be required to furnish the Owner with formal sworn statements as to their experience and their financial status.

Article 12. Material Guaranty

Before any Contract is awarded, the Bidder may be required to furnish without expense to the Owner, a complete statement of the origin, composition and manufacture of any or all materials proposed to be used in the construction of the work, together with samples, which samples may be subjected to the tests required by the Owner to determine their quality and fitness for the work.

Article 13. Addenda and Interpretations

No interpretation of the meaning of the Plans, Specifications or other Contract Documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to Tighe & Bond, Inc., 53 Southampton Road, Westfield, Massachusetts 01085, and to be given consideration must be received at least five days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Specifications which, if issued, will be mailed by certified mail with return receipt requested to all prospective bidders (at the respective addresses furnished for such purposes) not later than three days prior to the date fixed for the opening of bids.

Failure of any bidder to receive any such addenda or interpretation shall not relieve any bidder from any obligation under his bid as submitted.

All addenda so issued shall become part of the Contract Documents.

AWARD AND EXECUTION OF THE CONTRACT

Article 14. Consideration of Bids

The Owner reserves the right to reject any or all Proposals, to waive any and all technicalities and informalities as described under Article 9, to advertise for new Proposals or proceed to do the work otherwise, as it may deem best for its own interest.

The contracts awarded pursuant to Sections 44A to 44L of Chapter 149, registered sub-bids will be considered in accordance with the provisions of Section 44H of Chapter 149 including subsequent amendments thereto. In general, this Act provides that registered sub-bids will be received by the Awarding Authority before 12:00 noon at least four days -- Saturdays, Sundays and Legal Holidays excluded -- before the date fixed for the opening of general bids. Sub-bids not acceptable to the Awarding Authority must be rejected within two days thereafter. The Awarding Authority shall mail to every person on record as having a set of Plans and Specifications, a list of the acceptable sub-bids received and not rejected.

Article 15. Award of Contract

Unit price Contracts will be compared on the basis of the totals of the sums obtained by multiplying the Engineer's estimate of quantities by the unit price stated on the Proposal for each respective item.

The Contract will be awarded by the Owner as soon as practicable after the opening of bids. The successful bidder will be notified in writing, by mail, or otherwise, that his bid has been accepted and that he has been awarded the Contract.

On projects requiring the approval of an officer, board, or agency of the Federal Government, the award by the Owner and/or the release of the bidders shall be made within thirty days after such approval; in all other cases, an award shall be made within thirty days after the opening of bids.

Article 16. Return of Proposal Guaranty

All Proposal Guaranties of general bidders, except those under consideration by the Awarding Authority, will be returned within 5 days -- Saturdays, Sundays and Legal Holidays excluded -- after the opening of bids. Other Proposal Guaranties will be returned upon the execution and delivery of the general Contract.

All bid deposits of registered sub-bidders, except

- (a) Those of the sub-bidders named in the general bids of the three lowest responsible and eligible general bidders, and
- (b) Those of the three lowest and responsible and eligible sub-bidders for each sub-trade shall be returned within 5 days -- Saturdays, Sundays and Legal Holidays excluded -- after the opening of the general bids. The bid deposits of sub-bidders not returned pursuant to the provisions of the preceding sentence will be returned within 5 days -- Saturdays, Sundays and Legal Holidays excluded -- after the execution of the general Contract.

Article 17. Contract Bond Required

Prior to the execution of the Contract, the Contractor will be required to furnish a surety bond in the amount specified in the Supplementary Conditions as security for faithful performance of this Contract. The bond shall also guarantee payment of all persons performing labor on the project under this Contract and furnishing materials and/or equipment in connection with this Contract.

The bond must be in the usual and approved form and must also contain the following: "the principal shall pay for all labor performed or furnished and for all materials used or employed, and shall pay all persons who contract with the principal for labor and materials as provided in the General Laws of Massachusetts, Section 29 of

Chapter 149, then this obligation to be void, otherwise to remain in full force and effect".

Attorneys in fact who sign Contract Bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

The surety is to be a bonding company or security satisfactory to the Owner. Any bond must be with a bonding company having a place of business in the Commonwealth of Massachusetts.

Article 18. Execution of Contract

The Contractor to whom the Contract is awarded will be required to appear at the office of the Engineer with the surety offered by him and to execute the Contract within five days -- Saturdays, Sundays and Legal Holidays excluded -- after presentation thereof by the Awarding Authorities and execute a Contract in accordance with the terms of his bid.

The Contract shall be in writing on the forms provided.

Article 19. Failure to Execute Contract

Should the successful bidder fail to execute the Contract and/or to furnish the Contract Bond and Insurance as herein specified, within the five day time limit specified hereinbefore, the Owner may at his option determine that the bidder has refused to execute a Contract with the Owner. The Owner may then offer the Contract to the next lowest responsible bidder, if the Owner deems it to be advisable.

If any general bidder or registered sub-bidder fails to execute a Contract within five days -- Saturdays, Sundays and Legal Holidays excluded -- then the bidder's Proposal Guaranty shall be forfeited as liquidated damages and the Contract may be offered to the next lowest responsible bidder.

SCOPE OF WORK

Article 20. Intent of Plans and Specifications

It is the intent that the Plans and Specifications shall prescribe a complete work or improvement; and when the work is completed, the Contractor shall leave the job site in a neat and finished condition.

The Contractor shall do all the work and furnish all the materials, tools and appliances, except as otherwise specified, necessary or proper for performing and completing the work required by the Contract, in the manner and within the time specified, and in accordance with the Specifications and Drawings for the work, at the prices agreed upon.

All the work, labor and materials to be done and furnished under the Contract shall be done and furnished strictly pursuant to, and in conformity with the Specifications and Plans for the work, which said Specifications and Drawings shall form part of the Contract, and also in accordance with the directions of the Engineer as given from time to time during the progress of the work, under the terms of the Contract.

Article 21. Special Conditions

Construction items or conditions anticipated for any proposed work, and not covered by these "General Conditions", will be described and specified in "Supplementary Conditions", and "Technical Specifications". Said Supplementary Conditions and Technical Specifications shall be considered a part of the Contract. In case of conflict between the said Supplementary Conditions and General Conditions, the Supplementary Conditions shall govern. In case of a conflict between the said Supplementary Conditions and Technical Specifications, the Supplementary Conditions shall govern. In case of conflict between the Technical Specifications and General Conditions, the Technical Specifications shall govern.

Article 22. Alteration of Work

Should it be found desirable by the Engineer to make alterations in the form or character of any of the work done, or to be done, the Engineer may order such alterations to be made, defining them in writing, supplemented with drawings when in the opinion of the Engineer it is necessary and the alterations shall be made accordingly; provided that in case such alterations increase the cost of the work, the Contractor shall be remunerated at prices based on prices allowed on the same character of work under Specifications, and in case the alterations shall diminish the cost of the work, no allowance will be made for anticipated profits.

In case of any alteration, change or addition to the work as originally contemplated, and if said alteration, change or addition justified an increase in the cost of the work, the Owner reserves the right to decide the method that will be used to determine said additional costs (See Article 72).

In case of any alterations, so much of the Contract as is not necessarily affected by such alterations shall remain in force upon the parties thereto, and such alterations shall be made under the terms of and as part of the Contract, and the security for the performance of the Contract shall not be invalidated, but shall be held to secure in like manner the performance of the alterations made under the Contract and of any extra work done under provisions of Article 23.

The Contractor shall perform the work as increased or decreased within the qualifying limits named and subject to the provisions outlined above, but no allowance shall be made for any change in anticipated profits. Adjustments shall be considered waived unless specific complaint is made in writing by the Contractor previous to the construction of such alteration or change and within three calendar days following notice from the Owner of such alteration or change.

**Article 23. Extra Work**

The Contractor shall do any work not herein otherwise provided when and as ordered in writing by the Engineer.

If the Contractor claims that any instructions from the Engineer involve extra cost or an extension of time, he shall so notify the Engineer in writing within three (3) calendar days after the receipt of the Engineer's instructions and in any event before proceeding to execute the extra work. No claim from the Contractor will be considered valid unless made in accordance with the terms of this Article.

Such notice by the Contractor and the keeping of costs by the Engineers shall not in any way be construed as proving the validity of the claim.

Payment for extra work will be made in accordance with the provisions of Article 72.

The Owner may, at any time by a written order, and without notice to the surety or sureties, require the performance of such changes in the work as it may find necessary or desirable.

**Article 24. Maintenance of Detours**

When required by the Owner, a project shall be closed to travel during construction. Suitable detours shall be provided and maintained as directed or as specified in Articles 49 and 50 of the General Conditions and in Section 01570 of the General Requirements. Payment for this work is to be included by the Contractor in his price for the work. No special payment will be provided unless otherwise stated in the General Requirements.

**Article 25. Removal and Disposal of Structures and Obstructions**

Existing structures such as bridges, culverts, dikes, walls, pipes, guard railing, fences, street railway ties and rails, found within the project limits or right-of-way, which are to be replaced or rendered useless by new construction shall be removed by the Contractor at his own expense unless otherwise provided in the Technical Specifications, Division 2. When their location is such as not to interfere with the work, the removal shall not be done until the new structures replacing them are ready for traffic or until the Engineer shall permit.

All material in existing structures requiring removal shall remain the property of the Owner. The material shall be removed without damage, in sections which will permit easy handling and disposal, to locations within the limits of the project, and convenient for their subsequent removal by the Owner, or as directed by the Engineer. All discarded material, rubbish or debris shall be removed from the work and disposed of as directed. No foreign material or debris shall be permitted to remain or move in a waterway.

**Article 26. Rights in the Use of Materials Found on the Work**

The Contractor with the approval of the Engineer, may use suitable ledge, gravel, sand, loam, clay, or other material from within the location lines of the project under construction. If such use necessitates securing additional material for forming embankments, the Contractor shall at his own expense, furnish an amount of borrow of a satisfactory quality, equal to the amount of material taken, as measured in excavation. The Contractor shall not excavate or remove any material which is not within the excavation as indicated by the slope stakes and grade lines, without written approval. No excavated material suitable for use shall be wasted, unless as directed.

Unless otherwise provided, the material from any existing structure may be used temporarily by the Contractor during construction. Such material shall not be cut, bent, broken or otherwise damaged.

Nothing in the Contract shall be construed as vesting in the Contractor any right or property in the materials used after they have been attached or affixed to the work or the soil; but all such material shall, upon being so attached or affixed, become the property of the Owner.

**Article 27. Final Cleaning Up**

Upon completion of the work and before acceptance and final payment, the Contractor shall remove, at his own expense, from the project location and from adjoining property, all temporary structures and all surplus material and rubbish which may have accumulated during the prosecution of the work, and shall leave the work broom clean and in a neat and orderly condition.

No equipment or materials shall be left on the right-of-way or project limits without the written permission of the Engineers.

Unless otherwise provided, the Contractor shall be responsible for the work for a period of ONE YEAR after date of Acceptance. Neither the making of partial payments nor the making of the final payment shall relieve the Contractor of responsibility for faulty materials or workmanship and, unless otherwise specified, he shall remedy any defects and pay for any damage resulting from faulty materials or workmanship which shall appear within a period of ONE YEAR from the date of Acceptance (See Articles 73, 74 and 75, hereof).

**CONTROL OF WORK****Article 28. Authority of the Engineer**

The Engineer shall decide all questions which may arise as to the quantity, quality, acceptability, fitness and rate of progress of the several kinds of work to be performed and materials to be furnished under the Contract, and shall decide all questions which may arise as to the interpretation of any part of the Contract, especially

the Plans and Specifications which are a part thereof, as to the fulfillment of this Contract on the part of the Contractor, and the determination and decision of the Engineer shall be final and conclusive; and such determination and decision, in case any question shall arise, shall be a condition precedent to the right of the Contractor to receive any money hereunder.

The Engineer assumes no liability whatsoever for the obligations entered into by the Owner, or by the Engineer on behalf of the Owner, and the Contractor must look solely to the Owner for payment of any claims.

Article 29. Plans, Specifications and Detailed Drawings

All work shall be performed in strict conformity with the approved Plans and Specifications for the project.

The Owner is responsible for the adequacy of the design and sufficiency of the Plans and Specifications. The Owner, through the Engineer, or the Engineer acting as the Owner's representative, will furnish with reasonable promptness, additional instructions necessary for the proper execution of the work. These additional instructions may be either additional plans, detailed drawings, specifications, or descriptions as necessary. These additional instructions will become a part of the complete Contract Document.

Supplemental plans and detail drawings as required in the Specifications and furnished by the Contractor shall upon approval become a part of the complete Plans. Such approval of supplemental plans or detail drawings, however, shall not be construed as a complete check and shall not operate to relieve the Contractor of any of his responsibility under the Contract for the satisfactory completion of the work, nor for the accuracy of the dimensions, details or quantities or for their agreement. The Contractor is responsible for shop details, equipment details and design, quantities, dimensions and all checking to assure proper fitting.

When submitting detailed drawings for approval, the Contractor shall furnish a sufficient number of complete sets of the prints so that the Engineer can retain three complete sets and return the necessary sets to the Contractor with either approval or corrections marked thereon. If required by the Engineer, the Contractor shall furnish the Engineer with complete sets of prints, as directed, of the corrected and approved detailed drawings. No changes shall be made in the approved detailed drawings without the written consent of the Engineer.

The Contract price shall include the cost of furnishing all working drawings and the Contractor will be allowed no extra compensation therefor.

Any work done or materials furnished by the Contractor, prior to the approval of the working, drawing shall be at his own risk.

**Article 30. Conformity with Plans and Allowable Deviations**

The finished work shall conform in all respects to the lines, grades, cross sections and dimensions given on the approved Plans. Where conditions make it necessary or desirable for major deviation from the approved Plans, such changes shall be made as specified in Articles 22 and 23, upon authorization in writing by the Owner.

**Article 31. Coordination of Specifications and Plans**

The General Conditions, the Addenda, the Proposal Form, the Agreement Forms, the Plans, the Supplementary Conditions, the Technical Specifications, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. In case of disagreement, the Plans shall have precedence over the General Conditions; the Technical Specifications shall have precedence over both the Plans and General Conditions; the Supplementary Conditions shall govern over the Plans, the General Conditions, and the Technical Specifications; figured dimensions shall govern over scaled dimensions.

**Article 32. Cooperation by Contractor**

The Contractor will be given the reasonably necessary number of copies of approved Contract Drawings, Detail Sheets, Addenda and Specifications. He shall have one copy of all such information and a copy of the Specifications on the work and available for reference at all times during the prosecution of the work.

The Contractor shall have at all times a competent and reliable superintendent or foreman on the work, authorized to receive orders and to act for him. Whenever the Contractor is not present on any part of the work when it may be desired to give directions, orders will be given by the Engineer and they shall be received and executed by the foreman or superintendent who is in charge of the particular work in reference to which the orders are given.

The superintendent shall not be changed during the progress of the work without the consent of the Engineer unless he shall prove to be unsatisfactory to the Contractor, and on this account or otherwise shall cease to be in the Contractor's employment.

The Contractor shall provide all reasonable facilities to enable the Engineer to inspect the workmanship and materials entering into the work. He shall cooperate in the matter of setting and preserving stakes, bench marks, etc., for controlling the work.

The Contractor shall so carry on his work under the direction of the Engineer that public service corporations, or municipal departments may enter on the work to make changes in their structures or to place new structures and connections therewith without interference, and the Contractor shall have no claim for or on account of any delay which



may be due to or result from said work of public service corporations or municipal departments.

Article 33. Adjacent Contracts and Operations

Interference with the normal operation of adjacent facilities or equipment of the Owner shall be avoided wherever possible. Upon request by the Contractor, the Engineer will determine in advance whether such interference with existing facilities is unavoidable and will establish the necessary procedures involved. Except in an emergency involving the protection of life or property, the Contractor shall not operate any of the Owner's equipment, control devices, or similar items, except in the presence of and at the direction of a responsible representative of the Owner and the Engineer.

The Owner reserves the right to carry on work adjacent to the work under this Contract by either letting other Contracts or by use of the Owner's forces. The Contractor shall afford other Contractors and the Owner's forces reasonable opportunity for the carrying out of their work and shall properly coordinate his work with theirs. Wherever work being done by the Owner's forces or by other Contractors is adjacent to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer so as to secure the rapid completion of the various portions of the work in a most harmonious fashion.

If any part of the Contractor's work under this Contract depends on proper execution or results upon the work of any other Contractor or upon the Owner's forces, the Contractor shall inspect and properly report to the Engineer any defects in such work that render it unsuitable for proper execution and results. This Contractor's failure to so inspect and report shall constitute an acceptance of the other work as fit and proper for the reception of his work, except as to defects which may develop in the other work after the execution of this Contractor's work.

Article 34. Construction Surveys

The Owner will furnish to the Contractor the necessary benchmarks and base lines for locating the principal component parts of the work contemplated under this Contract. Based on this information, the Contractor shall lay out the work, marking and identifying all necessary points for construction as may be required. The Contractor shall furnish free of charge, all protective stakes and temporary structures as may be necessary for marking and maintaining points and lines given by the Engineer for the building of the work, and shall give the Engineer such facilities and materials for establishing said lines and points as he may require. The Engineer's stakes, benchmarks, and base lines shall be carefully preserved. If the Engineer's stakes and points are lost through the neglect of the Contractor and must be re-established, they will be re-established at the Contractor's expense.

**Article 35. Authority and Duties of Engineer's Assistants**

The Engineer may appoint such assistants and representatives as he desires and they shall be authorized to inspect work and materials, to give directions pertaining to the work or to the safety and convenience of the public, to approve or reject materials, to make measurements of quantities and to perform such other duties as may be designated by the Engineer.

In case of any dispute arising between the Contractor and the Engineer's assistants, as to materials furnished or the manner or performing the work, the Engineer's assistants shall have the authority to reject the materials or to suspend the work until the question at issue can be referred to and decided by the Engineer.

Engineer's assistants are not authorized to revoke, alter, enlarge, relax or release any requirements of these Specifications nor to issue instructions contrary to the Plans and Specifications. They shall in no case act as foreman or perform other duties for the Contractor.

**Article 36. Inspection of Work and Materials**

The Engineer's agents and employees of the Owner may for any purpose enter upon the work and premises used by the Contractor and the Contractor shall provide safe and proper facilities therefor.

The inspection or non-inspection of the work shall not relieve the Contractor of any of his obligations to fulfill the terms of the Contract as herein prescribed by the Plans and the Specifications.

The Contractor shall furnish the Engineer or his authorized representative with every reasonable facility and assistance for ascertaining whether or not the work as performed is in accordance with the requirements and intent of the Plans and Specifications. If so directed, the Contractor shall, at any time, before the acceptance of the work, remove or uncover any portions of the finished work necessary for inspection. After the inspection, the Contractor shall restore said portions of the work to the condition required by the Specifications.

The Contractor shall furnish written information to the Engineer stating the original sources of supply and dates of manufacture of all materials manufactured away from the actual site of the work. In order to ensure a proper time sequence for required inspection and approval, this information shall be furnished at least two (2) weeks (or otherwise directed by the Engineer) in advance of the incorporation in the work of any such materials.

Failure to reject any defective work or materials shall not in any way prevent later rejection when such defect is discovered, or obligate the Owner to make final acceptance.

Article 37. Removal of Defective or Unauthorized Work

All defective work shall be removed, repaired or made good, notwithstanding that such work has previously been inspected and approved or estimated for payment. If the work or any part thereof shall be found defective at any time before the final acceptance of the whole work, the Contractor shall at his own expense make good such defect in a satisfactory manner. If the defective or unauthorized work to be corrected was originally done by the Contractor, then he shall promptly correct his own work in accordance with the Contract and without expense to the Owner. If the defective or unauthorized work was carried out by a sub-contractor, then the sub-contractor shall carry out the replacement or corrective work as directed by the Contractor and the Engineer.

Any work done beyond the lines and grades shown on the Plans or as given, except as herein provided, or any extra work done without authority, shall be considered as unauthorized and at the expense of the Contractor. Such work will not be measured nor compensation allowed therefor. Work so done may be ordered removed at the Contractor's expense.

Upon failure of the Contractor to remove and satisfactorily dispose of any or all defective or unauthorized work, and to remedy the same after being so notified, the Engineer may cause such defective work to be remedied, removed and replaced, and such unauthorized work to be removed; and to deduct the costs therefor from any monies due to become due the Contractor.

Article 38. Final Inspection Report

Upon presentation of the Contractor's certification that the work has been substantially completed, the Engineer, as the authorized representative of the Awarding Authority, shall carry out a final inspection of the work and shall either certify to the Owner that the work required under the Contract has been substantially completed, or that the work has not been substantially completed. In the latter event, the Engineer, as the duly authorized representative of the Awarding Authority, shall prepare and submit to the Contractor an itemized list of incomplete or unsatisfactory work items required by the Contract which will be sufficient to demonstrate that the work has not been substantially completed.

Substantial completion shall be as defined in Chapter 30, Section 39G of the MGL as most recently amended by Chapter 460 of the Acts of 1978 or as amended thereafter.

Final completion, as required for meeting the requirements of the Contract for completion within the specified time, shall occur when, in the opinion of the Engineer, all work required under the Contract has been completed including all items of work included on punch lists issued by the Engineer.

## CONTROL OF MATERIALS

### Article 39. Source of Supply and Quality

The source of supply of each material shall be approved by the Engineer before delivery is started.

The Contractor shall furnish all materials required for the work specified in the Contract, and said materials shall meet the requirements of the Specifications for the kind of work involving their use.

Only new and first quality materials, conforming to the requirements of these Specifications and approved by the Engineer shall be used in the work. If, after trial, it is found that sources of supply which have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved material from other approved sources.

The Contractor may be required to furnish sworn certificates as to quality and quantity of materials before said materials are incorporated in the work.

### Article 40. Samples and Tests

Tests of materials will be made by the Owner or under its direction. The Contractor shall furnish such facilities as the Engineer may require for collecting and forwarding samples, and shall not make use of, or incorporate in the work, any material represented by the samples until the required tests have been made and the material accepted. The Contractor in all cases, shall furnish the required samples without charge. Where tests are required of materials already incorporated in the work, the Contractor shall furnish samples, cut from the completed work at a time and as directed by the Engineer. The area affected by the removal shall be replaced and refinished and the Contractor will receive no special compensation for any of the aforesaid work.

### Article 41. Delivery and Storage of Materials

Materials and equipment shall be progressively delivered at the site so there will be neither delay in the progress of the work nor an accumulation of material that is not to be used within a reasonable time.

Materials shall be stored at the expense of the Contractor so as to ensure the preservation of their quality and fitness for the work. When considered necessary by the Engineer, they shall be placed on wooden platforms or other hard clean surfaces, and not on the ground. Motors and mechanical equipment shall be placed in secure, dry and heated storage when directed by the Engineer. Stored materials shall be so located as to facilitate prompt inspection.

**Article 42. Defective Materials**

Materials not conforming to these Specifications shall be rejected, and removed from the work by the Contractor as directed. No rejected material, the defects of which have been subsequently corrected, shall be used except with the permission of the Engineer. Should the Contractor fail to remove defective material within the time indicated in writing, the Engineer shall have the authority to remove and replace the defective material, and the cost of such removal and replacement will be deducted from any monies due or to become due the Contractor.

The Contractor shall carefully inspect all materials and work furnished or provided by the Owner. Any defects observed by the Contractor shall be reported to the Engineer in writing. The Contractor's failure to so inspect and promptly report any defects shall constitute an acceptance of the materials and/or work furnished as being fit and proper for installation by the Contractor or for the reception of this Contractor's work. Thereafter, any defect observed shall be made good by the Contractor except that if the defect is in materials furnished by the Owner and is not related to the Contractor's actions, then the Owner will furnish new materials at no cost to the Contractor.

**LEGAL RELATIONS AND CONTRACTOR'S RESPONSIBILITY****Article 43. Laws to be Observed**

The Contractor shall keep himself fully informed of all existing and future Federal and State Laws, Municipal Ordinances and Federal, State and local Regulations, in any manner affecting those engaged or employed in the work, or the materials used in the work, or in any way affecting the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. If any discrepancy or inconsistency is discovered in the Contract for this work in relation to any such law, ordinance, regulation, order or decree, he shall forthwith report the same to the Engineer in writing. He shall, at all times himself observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees.

The Contractor's attention is directed to the fact that all applicable Federal, State and Municipal laws, rules and regulations of all authorities having jurisdiction affecting the project are deemed to be included herein, the same as though herein written in full. The Contractor's attention is directed to the Occupational Safety and Health Act 29 CFR Part 1926 and all amendments thereto which Act is commonly referred to as OSHA.

**Article 44. Insurance Requirements****1. Compensation Insurance for Workmen and Traffic Officers**

The Contractor shall, before commencing performance of the Contract, provide by insurance for the payment of compensation and the furnishing of other benefits under Chapter 152 of the General Laws, to all persons to be employed under the Contract, and he shall continue such insurance in full force and effect during the term of the Contract.

The Contractor shall take out and maintain at his own expense, insurance against damage arising from injury to uniformed police, referred to in Article 56, while they are engaged in the performance of their duties. The coverage and provisions of such insurance shall be similar to those required to ensure employees of the Contractor under the Workmen's Compensation Act, and shall be in addition thereto.

2. Contractor's Public Liability and Property Damage Liability Insurance

The Contractor shall furnish evidence to the Owner that with respect to the operations he performs, he carries Contractor's Public Liability Insurance providing for a limit of not less than a monetary value specified in the Supplementary Conditions for all damages arising out of bodily injuries or death in any accident, and Contractor's Property Damage Liability Insurance providing for a limit of not less than a monetary value specified in the Supplementary Conditions for all damages arising out of injury to or destruction of property, subject to that limit per accident a total (or aggregate) limit of a monetary value specified in the Supplementary Conditions for all damages arising out of injury to or destruction of property during the policy period.

If any part of the work is sublet, similar insurance shall be provided by or in behalf of the Subcontractors to cover their operations.

Such property damage and public liability insurance as are provided under this Contract must cover all the various types and items of work that are to be undertaken. For the purpose of this Contract, the insurance shall be considered to be in full effect from the date of signing of the Contract to the date of the last day of the guarantee period.

To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend and save harmless Owner and Engineer and their consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of any property (other than the Work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any act, error omission of Contractor, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

If, through acts of neglect on the part of Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the Work, Contractor shall settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor shall assert any claim against Owner on account of any such damage alleged to have been sustained,

Owner shall notify Contractor, who shall indemnify, defend, and save harmless Owner against any such claim.

If any and all claims against Owner or Engineer or any of their consultants, agents or employees by any employee of Contractor, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under the foregoing paragraphs shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any such Subcontractor or other person or organization under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts, but in all events the Contractor shall indemnify, defend and hold harmless the Owner and Engineer for all such claims.

The obligations of Contractor under the foregoing paragraph shall not extend to the liability of the Engineer, Engineer's consultants, agents or employees arising solely out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

### 3. General

Each insurance policy and each certificate of insurance shall include the name of the Awarding Authority and contain the stipulation that no cancellation of such insurance, whether by the insurer or by the insured, shall be valid unless written notice thereof is given by the party proposing cancellation to the other party and to the officer or agent who awarded the Contract at least fifteen days prior to the intended effective date thereof, which date shall be expressed in said notice. Notice of cancellation sent by the party proposing cancellation, by registered mail, postage prepaid, with a return receipt of the addressee requested, shall be sufficient notice. An affidavit of any officer, agent or employee of the insurer or of the insured, as the case may be, duly authorized for the purpose, that he has so sent such notice addressed as aforesaid shall be prima facie evidence on the sending thereof as aforesaid. This section shall apply to the legal representatives, trustee in bankruptcy, receiver, assignee, trustee and the successor in interest of any such Contractor.

Satisfactory proof of insurance coverage shall be given to the Owner. Four copies of the insurance certificate shall be furnished prior to the signing of the Contract. A complete policy will be furnished to the Engineer before the beginning of construction operation.

Failure to provide and continue in force all insurance required under the Contract during the life of this Contract shall be deemed a breach of the Contract and shall operate as an immediate termination thereof.

The aforesaid insurance shall be taken out and maintained at Contractor's expense.

Article 45. Massachusetts Department of Labor and Industries Minimum Wage Rates

For all Contracts subject to the provisions of Section 39M of Chapter 30 and/or Sections 44A to 44I of Chapter 149 of the Massachusetts General Laws, the Contractor shall comply with the Provisions of Section 26 to 27G, inclusive, of Chapter 149 of the General Laws of Massachusetts, as amended.

Article 46. Permits, Licenses and Approvals

The Contractor shall procure at his own expense all permits, licenses and approvals, pay all charges and fees and give all notices necessary and due in connection with the lawful prosecution of the work. This shall apply equally regardless of whether the permits and licenses are of a temporary nature necessary for the execution of the work or whether they are for permanent structures or permanent changes in existing facilities.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations having an effect on the work as drawn and specified by the Engineer.

Article 47. Patented Devices, Materials and Processes

Whenever the Contractor desires to use any design, device, material or process covered by letters patent or copyright, the right for such use shall be secured by suitable legal agreement with the patentee or Owner, and a copy of this agreement shall be filed with the Owner.

The Contractor shall save and hold the Owner harmless from all loss, cost, damage or expense that it may be put to by reason of any alleged infringements of any patent, or patents, covering the manufacture, installation or use of any part of the apparatus or equipment, or any machinery or mechanism or part of thing installed or used, or installed for the purpose of use in the work hereinafter contemplated. The Contractor does further agree that the Owner shall not be disturbed in the use or operation or installation of work or equipment herein contemplated by litigation based upon such alleged infringements, and the Contractor does hereby further agree that at his own expense he will defend any and all suits or proceedings for infringement, or otherwise, that may be brought or instituted by any party, persons, companies, or corporations against the said Owner for alleged infringement or infringements of any patent or patents. Notice of such action or of any action under infringement proceedings shall be served on the Contractor at his address in writing by registered mail by the Owner. Said Contractor shall then be required, through counsel, to assume the defense of and to defend same at his own expense.

Article 48. Sanitary Facilities, Weather Protection and Heat

The Contractor shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees as may be necessary to comply with the



requirements of health officials, local and state requirements for weather protection and heat, and of other authorities having jurisdiction.

Article 49. Public Safety and Convenience

The Contractor shall be responsible for the maintenance of traffic over, through and around the work included in his Contract with the maximum of safety and practicable convenience to such traffic during the life of the Contract, and whether or not work thereon has been suspended temporarily. He shall take all precautions for preventing injuries to persons or damage to property in or about the work. If the Contractor constructs temporary bridges or provides temporary crossing of streams, his responsibility for accidents shall include the roadway approaches as well as the structures of such crossings.

The work shall be carried on in such a manner as to provide safe passage at all times for public travel and with least obstruction to traffic. The convenience of the general public and of residents along and adjacent to the project shall be provided for in an adequate and satisfactory manner. The Contractor shall provide and maintain at his own expense (except as otherwise provided herein) in a safe and passable condition, such temporary by-passes and temporary bridges as may be necessary to accommodate traffic on and around the construction; and he shall provide and maintain, in a safe condition, temporary approaches to and crossings of intersecting highways.

Roads shall be closed to travel only as directed by the Engineer. Where the new construction coincides with the present traveled way, the Contractor shall so carry on his work that travel will not be obstructed. The Contractor shall at all times so conduct the work that the abutters shall have reasonable access to their property as directed by the Engineer. When it is necessary to leave materials and equipment upon the highway, they shall be placed so as to cause the least possible interference to pedestrians and other travel.

Approval of local fire department authorities shall be obtained prior to closing any private or public road to travel.

When the work in any way affects the operation, management, maintenance, business or traffic, on any railroad, such work shall be carried on in a manner satisfactory to the said railroad. The Contractor shall use all possible vigilance in order to effectually guard against all accidents or damages on the railroad due to his work, and the Contractor shall at all times during the progress of the work so manage and execute the same as to cause the least possible interference with the operation, management, business or traffic of the railroad.

In the event that the Contractor fails to comply with the provisions of this Article, then the Owner shall proceed to make such required improvements, detours, by-passes, etc., as he believes necessary. The Owner shall, at his own discretion, either proceed with said work immediately or after a suitable time limit specified in a notice to the Contractor. The cost of said work will be borne by the Contractor.

**Article 50. Barricades, Warning Signs and Lights**

The Contractor shall at his own expense provide, place and erect all necessary barricades and warning signs and furnish and keep lighted all lights necessary to protect the work, traffic, pedestrians and animals. He shall also furnish at his own expense a sufficient number of watchmen at all times to protect the work.

Highways closed to traffic shall be protected by suitable barricades and warning signs, and the Contractor shall provide and maintain adequate lights and illumination therefore. He shall be held responsible for all damage due to any failure of signs and barricades to protect the work properly from traffic, pedestrians, animals or other cases.

In the event that the Contractor fails to comply with the provisions of the Article, then the Owner shall proceed to make such required improvements, detours, by-passes, etc., as he believes necessary. The Owner shall, at his own discretion, either proceed with said work immediately or after a suitable time limit specified in a notice to the Contractor. The cost of said work will be borne by the Contractor.

**Article 51. Protection and Restoration of Property**

The Contractor shall, at his own expense, preserve and protect from injury all property either public or private along and adjacent to the project, and he shall be responsible for and repair at his own expense any and all damage and injury thereto. He shall exercise special care during his operations to avoid injury to underground structures such as water or gas mains, pipes, conduits, manholes, catchbasins, etc.

The Contractor shall cooperate with representatives of public service companies in order to avoid damage to their structures by furnishing and/or erecting suitable supports, props, shoring or other means of protection.

The Contractor shall comply with the provisions of Chapter 82, Section 40 of the Massachusetts General Laws and shall notify public utility companies in writing at least 48 hours before excavating in a public way. For the purpose of this Contract, this requirement for advance notice in writing shall apply to all utilities, both public and private, and shall apply to all locations at which construction is to be carried out.

Fire hydrants adjacent to the work at all times shall be readily accessible to fire apparatus and no material or other obstructions shall be placed within a radius of ten (10) feet of a fire hydrant.

The Contractor shall confine his movements and operations to the limits of the location; the area outside the scope of work shall not be disturbed.

Land monuments and property markers shall be carefully protected. If the Engineer deems it necessary to remove the same, the Contractor shall do so only after a Land Surveyor, registered in the Commonwealth of Massachusetts, has witnessed or otherwise referenced their location. When so directed by the Engineer, the Contractor

shall authorize his designated registered Land Surveyor to return said monuments and property markers to their exact location.

The Contractor shall not injure or remove trees or shrubs without prior written approval of the Engineer. Trees and shrubs temporarily removed shall be replaced. If any such tree or shrub fails to survive transplanting, it shall be replaced by a tree or shrub of same species and similar size.

Article 52. Responsibility for Claims

The Contractor shall assume complete responsibility for the work and take all precautions for preventing injuries to persons and property in or about the work. All injury or damage of whatever nature resulting from the work, or resulting to persons, property or the work during its progress, from any cause whatsoever, shall be the responsibility of and borne by the Contractor. He shall bear all losses resulting on account of the amount or character of the work, or on account of the weather elements or on account of other causes.

Damage to materials furnished by the Owner or damage to the Owner's property, either now existing or constructed under this Contract, and all loss or deterioration occurring prior to the final acceptance of the work, and resulting from the Contractor's operations, shall be replaced by the Contractor at no expense to the Owner.

The Contractor shall indemnify the Owner and the Consulting Engineer in accordance with provisions of last four paragraphs of Article 44, Section 2. Contractor's Public Liability and Property Damage Liability Insurance of these General Conditions.

Article 53. Contractor's Responsibility for the Work

Until its final acceptance by the Owner, the Contractor shall assume full charge and care of the work and he shall take every necessary precaution against injury or damage to the work by action of the elements, or from any cause whatsoever, whether arising from the execution or non-execution of the Contract. The Contractor shall bear all losses resulting to him on account of the amount or the character of the work, or because the nature of the land in or on which the work is done is different from what was estimated or expected, or on account of the weather elements, or other causes.

The Contractor shall rebuild, repair, restore and make good at his own expense, all injuries or damages to any portion of the work occasioned by any of the above causes before the completion and acceptance of the work by the Owner. Issuance of partial payment on any part of the work done shall not be construed as final acceptance of any work completed up to that time.

The Contractor shall reimburse the Owner for all expenses, losses, or damages, as determined by the Engineer, incurred by or in consequence of any defect, act, omission, neglect, or mistake of the Contractor, his employees, or Subcontractors.

The Contractor will be held responsible for any and all claims for damage to underground structures such as water or gas mains, pipes, conduits, manholes or catchbasins, due to his operations or to the operations of any of his employees or Subcontractors.

Locations shown for existing underground pipes and utilities are approximate only, as determined from records, M-scope surveys and field observation. The Contractor shall have no claim if any utility or pipeline is not shown in correct location or is present but not shown on the Plans. The Contractor shall be responsible for notifying utility owners in reasonable advance of his work and he shall request of the utility owner the staking out on the ground surface, of underground utilities and structures. The Contractor shall notify the Engineer of any refusal or failure to stake out utilities after reasonable notice, and the Engineer and the Contractor will jointly take reasonable action to determine the location of the utilities before the beginning of excavation.

Article 54. No Waiver of Legal Rights

Neither the inspection by the Owner nor any of its employees or agents, nor any order, measurement or certificate by the Engineer, nor any order by the Owner for the payment of money, nor any payment for, or acceptance of, the whole or any part of the work by the Engineer or Owner, nor any extension of time, nor any possession taken by the Owner or its employees, shall operate as a waiver of any provision of the Contract, or of any power herein reserved to the Owner or any right to damages herein provided. A waiver of any breach of the Contract is not a waiver of any other or subsequent breach. Any remedy provided in the Contract shall be taken and construed as cumulative, that is in addition to each and every other remedy, herein provided; and the Owner shall also be entitled as of right to a writ of injunction against any breach of any of the provisions of the Contract.

Article 55. Use of Explosives

When the use of explosives is necessary for the prosecution of the work, the Contractor shall observe the utmost care not to endanger life and property and whenever directed, the number and size of the charges shall be reduced. All explosives shall be stored in a secure manner and all such storage places shall be marked clearly "DANGEROUS - EXPLOSIVES", and shall be in the care of competent watchmen at all times. The method of storage and handling explosives and highly flammable materials shall conform with all the State laws and regulations, as well as any local requirements.

The Contractor must comply with all requirements of State and local laws, rules and regulations, Officers, Authorities and Board in using explosives. All necessary permits must be obtained by the Contractor from the proper Offices, Departments and Boards prior to such use of explosives. The Contractor shall give prior written notification of each day's contemplated use of explosives to the local Fire Department and Police Department.

Prior to blasting, the Contractor shall serve reasonable notice thereof to the operation official or company, or companies, leasing or owning pipes, conduits, poles, wires, etc., in danger of being injured by the blasting in order that a representative of said Owner or lessees may be present at the site, and he shall take proper precaution to prevent such injury by the use of sufficient dunnage.

No blasting shall be attempted until sufficient warning has been given to all persons in the vicinity of the work.

The cost of additional bond or insurance, if any, required by the Owner and/or his agents, or by other duly authorized officials, shall be borne by the Contractor. No extra compensation will be paid the Contractor for the additional risk involved in blasting, for the additional cost of the extreme precautions required for safe blasting or for the additional cost of bonds or insurance required.

Article 56. Traffic Officers and Flagmen

When in the opinion of the Owner, it is necessary that uniformed police be used to direct traffic, he may request the Contractor to obtain, in addition to the usual employees of the Contractor, a reasonable number of uniformed police, and the Contractor shall request the local Police Department to furnish such officers. These uniformed police shall at all times be subject to the direction and control of the Contractor.

Payment for police officers employed on the project as traffic officers shall be made pursuant to the provisions of Section 53C of Chapter 44 of the General Laws. This act requires that police officers when engaged on this project be municipal employees and that payment to them shall be made by the Owner's Treasurer. The cost of traffic officers will be borne by the Owner, unless otherwise specified in the Supplementary Conditions or General Conditions.

When any work is being done by the Contractor which may obstruct the tracks of a railroad or in any way endanger the running of trains, a flagman or flagmen, designated by the Chief Engineer of the railroad, shall be on duty for the protection of the property and traffic of the railroad.

The expense for all flagging service which is required shall be assumed by the Contractor and included in the prices bid for the various items for work to be performed under this Contract.

Article 57. Temporary Use of Work

Any portion of the work which is in an acceptable condition for use may be opened for use as directed and such opening for use shall not be construed as an acceptance of the work, or part thereof, nor shall it act as a waiver of any of the provisions of these Specifications and the Contract. The Contractor shall make at his own expense any and all necessary repairs or renewals to the work due to said opening

for use under instructions from the Engineer, as well as to defective materials and work, natural causes, to ordinary wear and tear or otherwise, preceding completion and acceptance of the work. Completed sections of the work shall be maintained by the Contractor in an acceptable manner, until the final acceptance of the Contract. He shall not permit use of any portion of the work unless so authorized by the Engineer.

### PROSECUTION AND PROGRESS

#### Article 58. Subletting or Assignment of Contract

The Contractor shall give his personal attention constantly to the faithful prosecution of the work, shall keep the same under his personal control, and shall not assign by power of attorney or otherwise, or sublet the work or any part thereof without the previous written consent of the Owner and shall not, either legally or equitably, assign any of the monies payable under this agreement, or his claim thereto, unless by and with the like consent of the Owner. He shall be responsible for the acts, omissions, neglect and mistakes of his Subcontractors, if any, and of all persons directly or indirectly employed by him or them in connection with the work.

For Contracts subject to the provisions of Section 39M of Chapter 30 and Sections 44A to 44L of Chapter 149 of the Massachusetts General Laws, the Contractor shall comply with the provisions of Section 179A of Chapter 149 of the General Laws, relative to preference to citizens.

#### Article 59. Schedule of Operations

Before commencing work, the Contractor shall submit a schedule of operations for approval by the Engineer. The schedule shall show the methods and order of operations that the Contractor proposes to use. Said schedule shall establish separable portions of the work although other items of work may also be considered "separable portions" of the work. Time for completion of each separable portion shall become an essential part of the Contract and shall be enforceable pursuant to the provisions of Articles 60, 61, 62 and 64. The approval of the schedule by the Engineer shall not be construed as relieving the Contractor from any responsibility.

#### Article 60. Prosecution of Work

The Contractor shall commence work within seven (7) calendar days after the execution of the Contract, or within such other period as the Engineer shall authorize in writing (approved by the Owner), at such points as the Engineer may direct, and he shall thereafter prosecute the work at such points and in such order as the Engineer may from time to time prescribe.

Should the prosecution of the work for any reason be discontinued, the Contractor shall notify the Engineer at least twenty-four (24) hours in advance of resuming operations.

It is the purpose of the Owner to complete the work in the shortest time possible and consistent with approved construction. To this end, Contractors will be required to use improved methods and equipment for doing the work and various parts thereof. All equipment shall be complete and well designed, and the organization shall be efficient and effective.

If, at the sole discretion of the Engineer, it is necessary at any time, the Contractor shall, when directed, employ such forces and equipment for one or more additional shifts as will be required to ensure the proper completion of the work. The Contractor shall provide and maintain sufficient lights for the safety of his construction forces and to ensure the proper construction, inspection and prosecution of the work, any lights necessary to protect the work or the public. The Contractor shall not receive any compensation therefore in addition to the Contract price.

The Contractor shall work diligently and steadily on the project. When ordered in writing by the Engineer, the Contractor shall resume work and/or increase personnel and equipment to accelerate progress. Failure of the Contractor to comply with said order within five (5) calendar days of receipt of same shall be considered as abandonment of the Contract. The Contractor shall not receive any compensation therefore in addition to the Contract price.

If the work is abandoned by the Contractor, the Owner may, without further notice and without in any way affecting the terms of the Contract, make such arrangements as deemed necessary and proper to complete the work. The Owner may either direct the bonding company to complete the work, may order the completion of the work with his own forces, or may employ another Contractor to complete the work.

#### Article 61.    Delay in Commencing Work

The Owner may delay the commencing of the work, or any part thereof, if the Owner shall deem it best for its interests to do so. The Contractor shall have no claim for damages on account of such delay, but shall be entitled to an equivalent extension of time in which to complete the whole or any portion of the work required under the Contract. The Contractor shall have no claim for damages on account of any delay on the part of the Owner in performing or furnishing any work or materials to be performed or furnished by the said Owner in connection with the execution of the work covered by the Contract.

#### Article 62.    Limitations of Operations

The Contractor shall so limit his operations and carry on his work in such a manner and sequence as to ensure the least possible interference with traffic and abutters.

The Owner reserves the right to limit the prosecution of the work to such points and in such order as the Engineer may direct.

Article 63. Character of Workers

The Contractor shall employ only competent employees to do the work, and whenever the Engineer shall notify the Contractor in writing that any worker is, in his opinion, incompetent, unfaithful, disorderly or otherwise unsatisfactory, such worker shall be discharged from the work, and shall not again be employed on it except with the consent of the Engineer.

Article 64. Temporary Suspension of Work

The Engineer shall have the authority to suspend the work wholly or any part thereof, for such periods as he shall deem necessary because of unsuitable weather conditions, or failure to complete adjacent contracts, or to provide time for moving of utilities, or for such other causes as are considered unfavorable for the satisfactory prosecution of the work, or for such time as he may deem necessary due to the failure of the Contractor to carry out orders given or to perform any provision of the Contract. Upon receipt of written order from the Engineer, the Contractor shall immediately suspend work or such part thereof in accordance with the order. The work shall be resumed when conditions so warrant or deficiencies have been corrected and the conditions of the Contract satisfied as ordered or approved in writing by the Engineer. No work shall be suspended without the written permission of the Engineer. No allowance of any kind will be made for suspension of work by order of the Engineer, except for an extension of time equal to the period of suspension.

Pursuant to Section 39D of Chapter 30A, every Contract subject to the provisions of Section 39M of Chapter 30A or subject to Section 44A of Chapter 149 of the Massachusetts General Laws shall be subject to the following provisions:

- (a) The Awarding Authority may order the General Contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the Awarding Authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the Awarding Authority to act within the time specified in this Contract, the Awarding Authority shall make an adjustment in the Contract price for any increase in the cost of performance of this Contract but shall not include any profit to the General Contractor on such increase; and provided further, that the Awarding Authority shall not make any adjustment in the Contract price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this Contract provides for an equitable adjustment of the Contract price under any other Contract provisions.
- (b) The General Contractor must submit the amount of a claim under provision (a) to the Awarding Authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this Contract



and, except for costs due to a suspension order, the Awarding Authority shall not approve any costs in the claim incurred more than twenty days before the General Contractor notified the Awarding Authority in writing of the act or failure to act involved in the claim.

#### Article 65. Failure to Complete Work on Time

On or before the date stated in the proposal for completion, the whole work shall have been performed in accordance with the terms of the Contract. The time in which the various portions and the whole of the Contract are to be performed and the work is to be completed is an essential part of the Contract.

In case the work embraced in the Contract shall not have been completed by the time stipulated therein (according to the foregoing requirements), the Contractor shall reimburse to the Owner a sum of money equal to the amount that the Owner is required to spend as a result of the delay in completion of the work. This amount shall include all identifiable costs including but not limited to engineering, inspection, interest and financing costs, loss of Federal and/or State grants, and fines imposed by regulatory agencies.

The Engineer is to constitute an adjudicator in regard to this Article of the Contract. He is to determine the cost of loss suffered by the Owner as a result of the delay in completion of the work.

Whatever sum of money may become due and payable to the Owner by the Contractor under this Article, may be retained out of money belonging to the Contractor in the hands and possession of the Owner; and it is agreed that this Article is to be construed and treated both by the parties to the Contract and by all courts of law or equity, not as imposing a penalty upon said Contractor for failing fully to complete said work as agreed on or before the time specified in the Proposal, but as liquidated damages to compensate the said Owner for all damages actually suffered because of the failure of the Contractor fully to complete said work on or before the date of completion specified in the Proposal.

Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, shall in no way operate as a waiver on the part of the Owner of any of its rights under the Contract.

#### Article 66. Annulment of Contract

If the Contractor shall be adjudged a bankrupt, or if he shall make a general assignment for the benefit of his creditors, or if a receiver of his property shall be appointed, or if the work to be done under the Contract shall be abandoned, as set forth in Article 60, or if the Contract or any part thereof shall be sublet without the previous written consent of the Owner (Article 57), or if the Contract or any claim thereunder shall be assigned by the Contractor otherwise than as herein specified, or if at any time

the Engineer shall be of the opinion, and shall so certify in writing to the Owner that the work, or any part thereof, is unnecessarily or unreasonably delayed, or that the Contractor has violated any of the provisions of the Contract, the Owner may notify the Contractor to discontinue all work, or any part thereof; and thereupon the Contractor shall discontinue such work, or such part thereof as the Owner may designate, and the Owner may thereupon, by contract or otherwise as it may determine, complete the work, or such part thereof, and charge the entire expense of so completing the work or part thereof to the Contractor; and for such completion the Owner for itself or its agents may take possession of and use or cause to be used in the completion of the work or part thereof, any such materials, machinery, implements or tools of every description as may be found upon the site of said work. The Owner shall not be liable for any depreciation, loss or damage to said materials, machinery, implements or tools during said use, nor until removed by the Contractor after completion of the work. Unless so removed within fifteen (15) days after mailing of notice so to do, they may be sold at public auction, after publication of notice thereof at least twice in any newspaper published in the Town, and the proceeds credited to the Contractor's expense subject to a lien for the storage charges.

If the Engineer shall certify that the rate of progress is not satisfactory, the Owner may, instead of notifying the Contractor to discontinue all work or any part thereof, notify him from time to time to increase the force, equipment and plant, or any of them, employed on the whole or any part of the work, stating the amount of increase required; and unless he shall within five (5) calendar days after any such notice, increase his force, equipment and plant to the extent required therein, and maintain and employ the same from day to day until completion of the work or such part thereof or until the conditions as to the rate of progress shall, in the opinion of the Engineer, be fulfilled, the Owner may employ and direct the labors of such additional force, equipment and plant as may, in the opinion of the Engineer, be necessary to ensure the completion of the work or such part thereof within the time specified, or at the earliest possible date thereafter, and the cost thereof is to be borne by the Contractor and his sureties, as directed. Neither the notice from the Owner to the Contractor to increase his force, equipment or plant, nor the employment of additional force, equipment or plant by the Owner shall be held to prevent a subsequent notice from the Owner to him to discontinue work under the provisions of the preceding portion of the Article.

All expenses charged under this Article shall be deducted and paid for by the Owner out of any monies then due or to become due the Contractor under the Contract, or any part thereof; and in such accounting the Owner shall not be held to obtain the lowest figures for the work of completing the Contract or any part thereof, or for ensuring its proper completion, but all sums actually paid therefore shall be charged to the Contractor and/or his surety. In case the expenses so charged are less than the sum which would have been payable under the Contract if the same had been completed by the Contractor, the Contractor shall be entitled to receive the difference; and in case such expenses shall exceed the said sum, the Contractor and his surety shall pay the amount of the excess to the Owner upon completion of the work, without further demand being made therefore.

## MEASUREMENT AND PAYMENT

### Article 67. Measurement of Quantities

For unit price Contracts, the Engineer shall determine the quantities of the various items of work performed.

Upon the completion of the work and after the final inspection report is made as described in Article 38, the Engineer will make final measurement to determine the quantities of the various items of work performed, as the basis for final payment. All measurements shall be made according to the United States standard units of measurements.

Throughout the duration of the project, all materials which are specified for measurement by weight shall be weighed on standard scales. If materials are shipped by rail or trucks, the car weights or quarry weights may be accepted, but the Owner reserves the right to require the Contractor to furnish sealed scales.

### Article 68. Scope of Payments

The Owner will pay and the Contractor shall receive and accept the compensation as herein provided, in full payment for the furnishing of all materials, labor, tools and equipment and for performing all work contemplated and embraced under the Contract, also for all loss or damage arising out of the nature of the work, or from the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered during the prosecution of the work and until its final acceptance by the Owner, and for all risks or every description connected with the prosecution of the work, also for all expenses incurred by, or in consequence of the suspension or discontinuance of the said prosecution of the work as herein specified, and for any infringement of patent, trade-mark or copyright, and for completing the work in an acceptable manner according to the Plans and Specifications.

The payment of any current estimate, or of any retained percentage shall in no way constitute an acknowledgement of the acceptance of the work or in no way or degree prejudice or affect the obligation of the Contractor, at his own cost and expense, to repair, correct, renew or replace any defects and imperfections in the construction of, or in the strength of, or quality of materials used in or about the construction of the work under Contract and its appurtenances, as well as all damages due or attributable to such defects; which defects, imperfections or damages shall have been discovered on or before the final inspection and acceptance of the work. The Engineer shall be the sole judge of such defects, imperfections, or damages and the Contractor shall be liable to the Owner for failure to correct the same as provided herein.

The compensation provided herein is to include the cost of the ONE YEAR guarantee period as specified under Articles 27 and 75.

Article 69. Claims Against Contractors

The Contractor shall pay all bills for labor and materials contracted by him and for the rental of appliances and equipment hired by him for or on account of the work herein contemplated.

The Owner may keep any monies, which would otherwise be payable at any time hereunder, and apply the same, or so much as may be necessary therefore, to the payment of any expense, losses or damages incurred by the Owner and determined as herein provided, and may retain, until all claims are settled, so much of the monies as the Owner shall be of opinion will be required to settle (1) all claims against the Owner and its officers and agents as specified in Articles 52 and 53, and (2) all claims for labor performed or furnished, for materials used or employed in such construction or repair, including lumber so employed which is not incorporated in the construction or repair work and is not wholly or necessarily consumed or made so worthless as to lose its identify but only to the extent of its purchase price less its fair salvage value, and for the rental or hire of vehicles, shovels, excavating and backfilling equipment, rollers propelled by steam or other power, concrete mixers, tools and other appliances and equipment employed.

If the monies retained under the Contract are insufficient to pay the sum due under the claims for labor and materials and for the rental of appliances and equipment filed as aforesaid, the Owner may, at its discretion, pay the same, and the Contractor shall repay to the Owner all sums so paid. The Owner may also, with the written consent of the Contractor, use any monies retained, due or to become due under the Contract, for the purposes of paying for labor and materials and for the rental of appliances and equipment for the work for which claims have not been filed as specified above. It is understood that the security required by Section 29 of Chapter 149 of the General Laws is obtained both by the bond accompanying the Contract and by the power of the Owner to retain and pay money under the provisions of this Article, but the release of one shall in no way impair or discharge the other.

Pursuant to the provisions of Chapter 30, Section 39F of the Massachusetts General Laws, the following sub-paragraphs (a) through (i) included herein are binding between the General Contractor and each Subcontractor on every Contract awarded pursuant to Sections 44A through 44L inclusive of Chapter 149 of the Massachusetts General Laws and the sub-paragraphs (a) through (h) are binding between the General Contractor and each Subcontractor on every Contract awarded pursuant to Section 39M of Chapter 30 of the Massachusetts Laws.

- (a) Forthwith after the General Contractor received payment on account of a periodic estimate, the General Contractor shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished by that Subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due for the Subcontractor by the General Contractor.

- (b) Not later than the sixty-fifth day after each Subcontractor substantially completes his work in accordance with the Plans and Specifications, the entire balance due under the Subcontractor less amounts retained by the Awarding Authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the Subcontractor; and the Awarding Authority shall pay that amount of the General Contractor. The General Contractor shall forthwith pay to the Subcontractor the full amount received from the Awarding Authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the General Contractor.
- (c) Each payment made by the Awarding Authority to the General Contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a Subcontractor shall be made to the General Contractor for the account of that Subcontractor; and the Awarding Authority shall take reasonable steps to compel the General Contractor to make each such payment to each such Subcontractor. If the Awarding Authority has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the General Contractor or which is to be included in a payment to the General Contractor for payment to the Subcontractor as provided in subparagraphs (a) and (b), the Awarding Authority shall act upon the demand as provided in this section.
- (d) If, within seventy days after the Subcontractor has substantially completed the Subcontract work, the Subcontractor has not received from the General Contractor the balance due under the Subcontract including any amount due for extra labor and materials furnished to the General Contractor, less any amount retained by the Awarding Authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the Subcontractor may demand direct payment of that balance from the Awarding Authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the Awarding Authority, and a copy shall be delivered to or sent by certified mail to the General Contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the Subcontract and also a statement of the status of completion of the Subcontract work. Any demand made after substantial completion of the Subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the Subcontractor has substantially completed the Subcontract work. Within ten days after the Subcontractor has delivered or so mailed the demand to the Awarding Authority and delivered or so mailed a copy to the General Contractor, the General Contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the Awarding Authority and a copy shall be delivered to or sent by certified mail to the Subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the Subcontract including any amount

due for extra labor and materials furnished to the General Contractor and of the amount due for each claim made by the General Contractor against the Subcontractor.

- (e) Within fifteen days after receipt of the demand by the Awarding Authority, but in no event prior to the seventieth day after substantial completion of the Subcontract work, the Awarding Authority shall make direct payment to the Subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the General Contractor, less any amount (i) retained by the Awarding Authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the General Contractor in the sworn reply; provided, that the Awarding Authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The Awarding Authority shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.
- (f) The Awarding Authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) in an interest-bearing joint account in the names of the General Contractor and the Subcontractor in a bank in Massachusetts selected by the Awarding Authority or agreed upon by the General Contractor and the Subcontractor and shall notify the General Contractor and the Subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the General Contractor and the Subcontractor or as determined by decree of a court of competent jurisdiction.
- (g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the General Contractor at the time of receipt of a demand for direct payment from a Subcontractor and out of amounts which later become payable to the General Contractor and in the order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the Awarding Authority to the General Contractor to the extent of such payment.
- (h) The Awarding Authority shall deduct from payments to a General Contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be earmarked for such direct payments, and the

Subcontractor shall have a right in such deductions prior to any claims against such amounts by creditors of the General Contractor.

- (i) If the Subcontractor does not receive payment as provided in subparagraph (a) or if the General Contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the Subcontractor and the Subcontractor does not receive payment for same when due less the deductions provided for in subparagraph (a), the Subcontractor may demand direct payment by following the procedure in subparagraph (d) and the General Contractor may file a sworn reply as provided in that same subparagraph. A demand made after the first day of the month following that for which the Subcontractor performed or furnished the labor and materials for which the Subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the General Contractor. Thereafter, the Awarding Authority shall proceed as provided in subparagraph (e), (f), (g) and (h).

Article 70. Payment for Increased or Decreased Quantities

An increase in quantities of work to be performed (as set forth in Articles 3, 22 and 23) will be paid for at the Contract unit price for the actual work done, in the same manner as if such work had been included in the original estimated quantities. No allowance will be made for anticipated profits involved in changes in quantities from those quantities originally estimated.

Changes involving extra work will be paid for according to the method stipulated in the extra work orders.

Article 71. Omitted Items

The Engineer may order omitted from the work, any items or portions of the work found unnecessary to the improvement and such omission shall not operate as a waiver of any condition of the Contract nor invalidate any of the provisions thereof, nor shall the Contractor have any claim for anticipated profit.

Article 72. Payment for Extra Work

Extra work will be paid for in accordance with the accepted and approved extra work orders according to procedures outlined in Articles 22 and 23.

The determination of the Engineer shall be final upon all questions pertaining to the amount and value of extra work performed.

In making any change contemplated, the charge or credit for the change shall be determined by the Owner in one of the following methods prior to the issuance of the order for the changed work:

- (1) The order shall fix the total lump sum cost of the change in the work as mutually agreed on between the Owner and the Contractor and shall set out such cost as the amount to be added to or deducted from the Contract amount by virtue of the change in the work. The cost as above shall include the Contractor's overhead and profit subject to a maximum limitation of fifteen (15) percent. In any change which involves a net credit to the Owner, no allowance for overhead and profit shall be figured.
- (2) By estimating the number of unit quantities of each part of the work which is changed and then multiplying the estimated number of such unit quantities by the price (which price shall include the Contractor's overhead and profit) for a unit quantity thereof. Unit prices refer to unit prices bid herein. In the event there are no unit prices in the Proposal that are applicable, the Owner and the Contractor may work out a mutually agreeable unit price. The Engineer shall determine whether or not the unit prices in the Proposal are applicable to the extra work under consideration.
- (3) By ordering the Contractor to proceed with the work and to keep and present in such forms as the Owner may direct, a correct account of the cost of the change together with all vouchers therefore. The cost may include a lump sum allowance (fixed fee) for profit and overhead of fifteen (15) percent. The Contractor's labor costs may be increased by the cost of the various health, welfare, and liability insurance he is required to carry. The Contractor's total actual cost may be increased by the cost of his Performance Bond.

In figuring changes, the instructions for measurement of quantities set forth in the Supplementary Conditions and Technical Specifications shall be followed insofar as possible. Items such as shovels, picks, small tools, manual equipment, melting pots, etc., shall be considered as part of the Contractor's overhead.

For machinery, trucks and equipment, a standard rental allowance shall be charged. A reasonable rental allowance determined by the Engineer based on published rates and reasonable rental periods shall be used. If a piece of equipment used on extra work for a short period of time (hours or days) is on the job, or has previously been rented for a long period of time (months), then the long-term rental rate shall be used in determining costs.

In the case of any extra work ordered by the Owner and completed by a Subcontractor on the project, the General Contractor will be allowed to increase the Subcontractor's cost to him by 5% to cover bookkeeping costs, overhead, etc. In determining costs, the Subcontractor is to use one of the three methods described hereinabove, as directed by the Engineer.



**Article 73. Partial Payments**

For unit price Contracts, the Engineer shall, once in each month, make an estimate in writing of the total value of the work completed to the time of such estimate.

For lump sum Contracts, the Contractor shall, prior to the date of the initial partial payment request, submit to the Engineer a draft breakdown of the payment request form. Typically, the breakdown shall reflect the various tasks required to perform the contemplated work. The Contractor shall furnish to the Engineer his office estimate of the quantities for those items in the breakdown for which unit prices are appropriate. The Engineer reserves the right to require further breakdown of any line items throughout the duration of the project.

During the last week of each month for the duration of the Contract, the Contractor shall submit to the Engineer for review and comment, a draft of each partial payment request. The Engineer shall promptly review and return the payment request with appropriate notations to the Contractor for correction and re-submission.

The Owner shall retain a fixed percentage of each monthly estimate as part security for the fulfillment of the Contract by the Contractor. The maximum retainage shall be 5% or any other amount as defined in MGL. The Owner may at its sole option reduce retainage as it deems this to be prudent.

The Owner shall pay monthly to the Contractor, while carrying on the work, the balance not retained as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of this Contract.

No such estimate or payment shall be required to be made when, in the judgement of the Engineer, the work is not proceeding in accordance with the provisions of the Contract, or when in his judgement the total value of the work done since the last estimate amounts to less than three hundred (\$300) dollars.

It is the intention of this Article of the Specifications to control the delivery of materials and equipment to the project so that materials and equipment are available when required but not unreasonably in advance of the time required.

Major process equipment must be suitably stored in order to be included in the periodic payments. Suitably stored shall mean storage in a dry, watertight, heated and insured commercial warehouse facility approved by the Engineer in writing. All drive motors shall be equipped with thermostatically controlled strip heaters. The Owner assumes no responsibility for physical damage to the equipment, corrosion, damage to motors due to condensation or any other factors which render equipment defective.

Partial payment request for so-called "engineering costs" by equipment manufacturers shall not be honored by the Owner. All such costs shall be distributed proportionately among the various items of equipment/hardware to be furnished.

For Contracts awarded under Sections 44A to 44L of Chapter 149, the following paragraph is included pursuant to the provisions of Section 39K, Chapter 30 of the Massachusetts General Laws:

"Within fifteen days (twenty-four days in the case of the Commonwealth) after receipt from the Contractor, at the place designated by the Awarding Authority if such a place is so designated, of a periodic estimate requesting payment of the amount due for the preceding month, the Awarding Authority will make a periodic payment to the Contractor for the work performed during the preceding month and for the materials not incorporated in the work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the Contractor has title or to which a Subcontractor has title and has authorized the Contractor to transfer title to the Awarding Authority, less (1) a retention based on its estimate of the fair value of its claims against the Contractor and less (2) a retention for direct payments to Subcontractors based on demands for same in accordance with the provisions of Section 39F, and less (3) a retention not exceeding five percent of the approved amount of the periodic payment. After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the Contractor fully completes the work or substantially completes the work so that the value of the work remaining to be done is, in the estimate of the Awarding Authority, less than one percent of the original Contract price, or (b) the Contractor substantially completes the work and the Awarding Authority takes possession for occupancy, whichever occurs first, the Awarding Authority shall pay the Contractor the entire balance due on the Contract less (1) a retention based on its estimate of the fair value of its claims against the Contractor and of the cost of completing the incomplete and unsatisfactory items of work and less (2) a retention for direct payments to Subcontractors based on demands for same in accordance with the provisions of Section 39F, or based on the record of payments by the Contractor to the Subcontractors under this Contract if such record of payment indicates that the Contractor has not paid Subcontractors as provided in Section 39F. If the Awarding Authority fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the Contractor; provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for final payment until fifteen days (twenty-four days in the case of the Commonwealth) after receipt of such a periodic estimate from the Contractor, at the place designated by the Awarding Authority if such a place is so designated. The Contractor agrees to pay to each Subcontractor a portion of any interest paid in accordance with the amount due each Subcontractor."

Partial payments shall not be construed as acceptance of title.

The Owner may increase the retained percentage as security for claims or costs incurred under Articles 60, 64, 65 and 68, or any other section of the Contract.

Article 74. Acceptance and Final Payment

Final payment shall be made pursuant to the provisions of M.G.L. Chapter 30, Section 39G or 39K, as applicable. **DELETE**

For unit price Contracts, the Engineer shall, as soon as practicable after the satisfactory completion of the final inspection report (Article 38), make a final estimate of the value of work constructed. This final estimate shall contain all final quantities for all items of the Contract and for all extra work authorized. This final estimate shall be submitted to the Contractor for certification.

For lump sum Contracts, the Contractor shall submit to the Engineer for review and comment a draft of the final payment request, including claims for all extra work authorized. Upon approval by the Engineer, the final payment request shall be certified by the Contractor.

The Owner shall, upon approval of the final estimate certified by the Engineer and the Contractor, issue a semi-final partial payment providing for payment of all amounts due less the percentage retainage and any amounts due the Owner.

All prior estimates and payments shall be subject to correction at the time of preparation of the final estimate.

Article 75. Guarantee Period

The Contractor shall guarantee all work under this Contract for a period of ONE YEAR from the date of the final inspection report, unless otherwise specified. The cost of the guarantee is to be included by the Contractor in his proposal form Contract and no additional payment will be provided.

The guarantee shall cover and include all workmanship, materials, equipment, and performance, and all combinations thereof required in the work under the Contract. Any and all defects and/or deficiencies which become evident during the guarantee period shall be corrected, repaired, replaced, or otherwise remedied to the satisfaction of the Owner and Engineer at no cost of any nature to the Owner or Engineer.

END OF SECTION

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SUPPLEMENTARY CONDITIONS

**SECTION 00800**

**SUPPLEMENTARY CONDITIONS**

**PART I GENERAL**

**1.01 SECTION INCLUDES**

- A. Insurance Requirements
- B. Occupational Safety and Health Act
- C. Contractor's Records, Bookkeeping, Accounting Controls and Financial Statement
- D. Special Provisions

Appendix A - Work Plan

Appendix B - Health and Safety Plan

**1.02 RELATED SECTIONS**

- A. General Conditions

**1.03 INSURANCE REQUIREMENTS**

- A. Work under this Contract shall not commence until the Contractor has obtained all insurance required by the Owner and until such insurance has been approved by the Owner.

- B. Reference Article 44 of the General Conditions.

- 1. Workmen's Compensation and Employer's Liability Insurance as required by the Workmen's Compensation Laws of the State of Illinois including both statutory and Coverage B. The Contractor shall require any subcontractor similarly to provide workmen's compensation insurance for all of the latter's employees until such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this contract at the site of the project is not protected under the workmen's compensation statute, the Contractor shall provide and shall cause each subcontractor to provide for the protection of such class of employees.

2. Comprehensive General Liability Insurance covering Bodily Injury and Property Damage as follows:

Limits of Liability

Bodily Injury	\$ 1,000,000 each person \$ 1,000,000 each occurrence \$10,000,000 aggregate products
Property Damage	\$ 1,000,000 each occurrence \$10,000,000 aggregate operations \$10,000,000 aggregate protective \$10,000,000 aggregate products \$10,000,000 aggregate contractual

Written notification of cancellation or change of coverage shall be furnished to all certificate holders named above by registered mail thirty (30) days prior to such change.

The Comprehensive General Liability Policy shall provide insurance for the Contractor for Bodily Injury and Property Damage to third persons arising out of:

- a. Work performed by the Contractor himself with his own employees, called "premises-operations".
- b. Work performed by his Subcontractors, called "sublet work" or "independent Contractors" (this is referred to as Contractor's Protective Liability).
- c. Broad Form Contractor's Liability Insurance which shall include a "hold harmless" clause or indemnity agreement, as required and listed under Article 44 of the General Conditions. This "Hold Harmless" as listed in Section 2, paragraph 4 of Article 44 must be clearly referenced on each of the Contractor's insurance certificates.
- d. Products Liability coverage covering the completed building or installation or products furnished. (This is called Products Liability Insurance for the Manufacturer and Completed Operations Liability Insurance for the Manufacturer and Completed Operations Liability Insurance for the Contractor).
- e. Special Hazards Insurance - Full coverage for damage or loss resulting from Type C - Collapse or Structural Injury, Type U - Underground Damage.

3. Comprehensive Automobile Liability Insurance covering Bodily Injury and Property damage, as follows:

Limits of Liability

Bodily Injury	\$1,000,000 each person \$1,000,000 each accident
Property Damage	\$1,000,000 each accident

This insurance shall apply with all respects to all owned or hired vehicles of the Contractor and nonownership protection for all employees of the Contractor engaged in the performance of this Contract.

4. The Contractor shall take out, furnish (to the Owner) and maintain during the life of this Contract, complete Owner's Protective Liability and Property Damage Liability Insurance in coverage amounts as specified under paragraph 2. A copy of the actual policy shall be provided to the Owner.
5. All policies shall be written that the Owner will be notified of cancellation or restrictive amendment by Registered Mail at least 15 days prior to the effective date of such cancellation or amendment. Certificates from the insurance carrier stating the limits of liability and expiration date shall be filed with the Engineer before operations are begun. Such certificates not only shall name the types of policy provided, but also shall refer specifically to this Contract and Article and the above paragraphs in accordance with which insurance is being furnished, and shall state that such insurance is as required by such paragraphs of this Contract, and shall be sufficiently comprehensive as to permit the Owner or the Engineer to determine that the required insurance coverage has been provided without the necessity of examining the individual insurance policies.
6. If the initial insurance expires prior to completion of the work, renewal certificates shall be furnished by the date of expiration.
7. The Contract shall require each of his Subcontractors to procure and maintain, until the completion of that Subcontractor's work, insurance of the types and to the limits specified in paragraphs A to C, inclusive, above. It shall be the responsibility of the Contractor to ensure that all of his Subcontractors comply with all of the insurance requirements contained herein relating to such Subcontractors.

8. The Contractor shall furnish the Engineer four (4) copies of certificates of insurance. The Contractor is warned to read carefully and to have his insurance company read carefully Article 44 of the General Conditions. The certificates must indicate all exclusions contained in the policies as well as reference the "Hold Harmless" coverage required.

#### 1.04 OCCUPATIONAL SAFETY AND HEALTH ACT

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, part 1926 and all subsequent amendments. Contractors shall be familiar with the requirements of these regulations. The Owner and the Engineer shall not be held liable for any fines or penalties resulting from violations of these regulations by the Contractor.

#### 1.05 SPECIAL PROVISIONS

##### A. Owner

1. For the purposes of this Contract the Owner shall be Litton Systems, Inc., Arlington, VA.

##### B. Liquidated Damages

1. In order to guarantee that the project is completed within the time specified in the contract, any failure of the Contractor or any of this Subcontractors to complete the project on schedule will be subject to the terms of the General Conditions concerning liquidated damages, the Contractor must schedule his work to allow sufficient time for testing prior to the completion date. In accordance with the General Conditions section of this document, the Contractor will be charge liquidated damages for each calendar day that the work goes beyond the completion time specified in his Proposal unless an Engineer-approved extension of time is allowed due to circumstances beyond the Contractor's control. Notwithstanding the provisions of Article 65 of the General Conditions, for the purposes of this project, liquidated damages for failure to complete all work included under this Contract within the time stipulated in the Agreement shall be equal to the sum of \$500 per day.
2. The Contractor's attention is directed to the provisions of Article 65 of the "General Conditions" of this Contractor. For the purposes of this Article, "Completion" is hereby defined as the time when all of the work is completed. The word "Completion" is defined to include the clean-up of the work site and the return



of the entire area to a condition that is equal to or better than its original condition.

**C. Agreements with Property Owners**

1. Wherever the Contractor makes an agreement with a private property owner for the use of private property for the storage of equipment and/or materials, stockpiling of materials, disposal of material, or any other use resulting from this Contract, the agreement shall be in writing and signed by both parties. The agreement shall state all compensation, both financial and materials, such as improvements to the property. The Contractor shall furnish the Owner with a copy of each agreement. All financial references may be deleted from the Owner's copy.

**D. Standard Specifications**

1. Appended to and a part of this Contract are several Standard Specifications and Details, etc. which relates to various parts of the work.
2. The Contractor will be required to perform the work under this Contract in accordance with all the applicable parts of these Standard Specifications and Details.

**E. Payment for Stored Materials**

1. Under this contract there will be no allowance for payment of stored materials on site not yet incorporated into the work. Payment will only be made for completed work items.

**F. Existing Utilities**

1. The location of existing underground pipe, tunnels and utilities is the responsibility of the contractor. The Contractor shall make his own investigations and determinations relative to all underground structures. Some plans may exist, but field verification is mandatory.

The location of existing water mains and existing service pipes is not shown. It should be expected that the existing service pipes may require some effort on the part of the Contractor, to properly locate and prepare for the remediation and/or demolition.

2. The Contractor shall be required to notify utility companies of his work by calling 815-741-5000 and obtain J.U.L.I.E. identification numbers.

3. Underground water pipes and other utilities will have to be marked on the ground by J.U.L.I.E. or the City before the bid period and prior to the start of work. The City must also be contacted by the Contractor (before digging) for any sewer or storm drain locations.
4. The Contractor shall protect and support all existing utilities and shall repair any damage to them resulting from this operations at his expense. The Contractor shall have no claim if any utility or pipeline damage by his operation is not located, or is present but not shown.
5. It will be the Contractor's responsibility to provide written notice with any and all utility companies, "public and private" with whose facilities the project may come in contact, either above ground or below ground, at least 72 hours before working near these facilities.
6. It will be the responsibility of the Contractor to notify personnel at the Utility Owner's offices in advance of the time when he will be working near property owned or controlled by the various listed utilities or public departments.
7. The Contractor shall be expected to pay for services billed to him by any of the utilities and the Contractor is advised that he must acquaint himself with any charges that are to be made against him by utilities for providing information on underground installations and in protecting these, as well as above-ground installations.
8. The Contractor shall not be compensated for any cost to him in connection with services rendered in locating buried utilities and in protecting utilities. The Contractor shall include in his proposal the cost to him for the work.

**G. Permits and Licenses**

1. The Contractor shall be responsible for obtaining any and all permits, licenses and approvals necessary for the contemplated work.

**H. Manufacturers' Experience**

1. Whatever it is written that a manufacturer must have a specified period of experience with his product, equipment which does not meet the specified experience period can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which

will guarantee replacement of that equipment in the event of a failure.

**I. Police Protection**

1. When in the opinion of Litton Systems or the Engineer, Police Department traffic officers and flagmen are required, and/or by the Contractor, officers will be provided. All payment for police protection for traffic control shall be paid for by the Contractor. The Contractor should carry a sufficient amount of money in his lump sum bid, Item No. 1 for these costs. No other reimbursement for police and/or security will be made to the contractor by the Owner.

**J. Site Security**

1. The Contractor is responsible for maintaining site security during the entire phase of this project.

**K. Massachusetts General Law**

1. References to MGL in the General Conditions that pertain to public bidding and public construction are not applicable to this contract. The following paragraphs of the General Conditions are deleted from this Contract:

1. Article 4, Paragraph 3.
2. Article 14, Paragraph 2.
3. Article 16, Paragraph 2.
4. Article 38, Paragraph 2.
5. Article 45, In its entirety.
6. Article 58, Paragraph 2.
7. Article 64, Paragraph 2.
8. Article 69, Paragraph 4.
9. Article 73, Paragraph 10.
10. Article 74, Paragraph 1.

**L. Bidding**

1. Replace Article 6, Paragraph 3 of the General Conditions with: "Proposals received after the designated time or at a location other than the designated location, as stated in the Instructions to Bidders, may, at the Owner's discretion, be rejected as unresponsive.
2. Delete Article 8 of the General Conditions. Bids will not be publicly opened.

**M. Bonds**

1. Reference Article 17 of the General Conditions. The surety shall be a bonding company having a place of business in the State of Illinois.

**END OF SECTION**

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**DIVISION 1 - GENERAL REQUIREMENTS**

**SECTION 01010**

**SUMMARY OF WORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. The Work of this Contract is described in these specifications entitled:

The Demolition and Site Remediation  
of the Lake Salvage Facility  
2527-29 West Lake Street  
Chicago, Illinois

Tighe & Bond, Inc.  
Consulting Engineers  
Westfield, Massachusetts

- B. The project consists of all work associated with site remediation, cleanup and demolition of designated sections of the facility, as shown on the Plans or described in the Specifications. A general description of each work item is provided in Section 01025.

- C. Contract Completion.

**1.02 RELATED SECTIONS**

- A. Documents affecting work of this section include, but are not necessarily limited to, the General Conditions, Supplementary Conditions, and all Sections in these Specifications.

**1.03 CONTRACT COMPLETION**

- A. All work under this Contract shall be brought to final completion within the time frame stipulated in the Agreement, which is one hundred six (106) calendar days or July 20, 1995. The cleanup and demolition of the buildings shall be substantially completed within the time frame stipulated in the agreement which is fourteen (14) calendar days or April 19, 1995. Waste characterization/disposal shall be completed by June 21, 1995. The confirmatory sampling program and analytical results shall be completed by July 20, 1995.

**END OF SECTION**

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## SECTION 01025

## MEASUREMENT AND PAYMENT

## PART 1 GENERAL

- A. The Contractor shall price each item as Lump Sum or Unit Pricing, as indicated. The Owner will select the following items in accordance with the most cost-effective proposal to complete the work outlined in this Project Manual. The following is a general description of each item.

1.01 BASE BID - Mobilization/Demobilization

- A. For mobilization and demobilization of personnel, equipment and materials on-site to perform the work described in this Project Manual, site security, as well as work associated with the general clean-up of the site following the completion of all activities. Included under this item is all work associated with securing openings in the building structures with plywood at the conclusion of the project.
- B. The Contractor will be paid the lump sum price as written in the proposal for the preceding work, which shall be full compensation for all labor, including police and security protection, equipment and materials as required or incidental to the carrying out of the work specified.

1.02 ALTERNATE 1 (ADD) - Demolition of Incinerator Structures

- A. For the demolition and stockpiling at the site, the two incinerators and the stockpiling of remaining ash material for later disposed to a RCRA permitted TSDF.
- B. The Contractor will be paid the lump sum price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified.

1.03 ALTERNATE 2 (ADD) - Litter Removal/Stockpiling

- A. For the removal and stockpiling of existing litter to a designated area within the site.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the number of cubic yards of stockpiled litter.

**1.04 ALTERNATE 3 (ADD) - Selective Building Demolition**

- A. For the demolition and stockpiling of selected building structures for later disposal to a RCRA permitted TSDF.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the number of cubic yards of stockpiled materials.

**1.05 ALTERNATE 4 (ADD) - Selective Building Demolition/Stockpiling**

- A. For the demolition and stockpiling of selected building structures for later disposal to a demolition landfill.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the number of cubic yards of the stockpiled materials.

**1.06 ALTERNATE 5 (ADD) - Waste Characterization**

- A. For sample collection and laboratory analyses of the various wastes generated during the progress of the work for the purpose of determining the most appropriate disposal method.
- B. The Contractor will be paid the lump sum price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified.

**1.07 ALTERNATE 6 (ADD) - Hazardous Waste Disposal to a TSDF**

- A. For the loading, transportation and disposal of hazardous wastes generated during the demolition work to a RCRA permitted TSDF.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken of the actual tonnage of waste disposed on the basis of weigh slips.



**1.08 ALTERNATE 7 (ADD) - Waste Disposal to a Demolition Landfill**

- A. For loading, transportation and disposal of demolition waste to a demolition landfill.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken of the actual tonnage of waste disposed on the basis of weigh slips.

**1.09 ALTERNATE 8 (ADD) - Liquid Hazardous Waste Disposal to a POTW**

- A. For the disposal of liquid wastes generated during demolition work which may be accepted for disposal at a publicly owned treatment works (POTW).
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of gallons of liquid waste disposed at a POTW.

**1.10 ALTERNATE 9 (ADD) - Litter Disposal to a Lined Landfill**

- A. For loading, transportation and disposal of site litter to a lined landfill.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken of the actual tonnage of waste disposed on the basis of weigh slips.

**1.11 ALTERNATE 10 (ADD) - Laboratory Analysis**

- A. For providing labor, materials and equipment to wipe sample designated building structures and concrete pavement at the site to determine the extent of dioxin, lead and PCBs contamination following the implementation of each clean-up test.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials and laboratory analyses of the wipe samples as required or incidental to the carrying out of the work specified. Measurement shall be taken of the total number of dioxin, lead and PCBs wipe samples collected and analyzed.

1.12 ALTERNATE 11 (ADD) - Clean-up Test/Vacuum

- A. For providing labor, materials and equipment to test the effectiveness of vacuum clean-up methods on designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of vacuum clean-up tests performed.

1.13 ALTERNATE 12 (ADD) - Clean-up Test/Power Wash

- A. For providing labor, materials and equipment to test the effectiveness of power wash clean-up methods on designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of power wash clean-up tests performed.

1.14 ALTERNATE 13 (ADD) - Clean-up Test/Chemical Wash

- A. For providing labor, materials and equipment to test the effectiveness of chemical wash clean-up methods on designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of chemical clean-up tests performed.

1.15 ALTERNATE 14 (ADD) - Clean-up Test/Scarification

- A. For providing labor, materials and equipment to test the effectiveness of scarification clean-up methods on designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of scarification clean-up tests performed.

**1.16 ALTERNATE 15 (ADD) - Site Decontamination - Vacuum**

- A. For providing labor, materials and equipment to vacuum designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of square feet vacuumed.
- C. The Contractor is advised that each vacuumed surface area will be measured only once, following the initial decontamination work. Should additional decontamination efforts be required, the Contractor shall provide the personnel, labor, materials and equipment to decontaminate those surface areas in question until the levels of PCBs, lead and/or dioxins are below the threshold clean-up standards for the site at no additional cost.

**1.17 ALTERNATE 16 (ADD) - Site Decontamination - Power Wash**

- A. For providing labor, materials and equipment to power wash designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of square feet power washed.
- C. The Contractor is advised that each power washed surface area will be measured only once, following the initial decontamination work. Should additional decontamination efforts be required, the Contractor shall provide the personnel, labor, materials and equipment to decontaminate those surface areas in question until the levels of PCBs, lead and/or dioxins are below the threshold clean-up standards for the site at no additional cost.

**1.18 ALTERNATE 17 (ADD) - Site Decontamination - Chemical Cleaning**

- A. For providing labor, materials and equipment to chemically clean designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials as required or incidental to the carrying out of the

work specified. Measurement shall be taken in place of the total number of square feet chemically cleaned.

- C. The Contractor is advised that each chemically cleaned surface area will be measured only once, following the initial decontamination work. Should additional decontamination efforts be required, the Contractor shall provide the personnel, labor, materials and equipment to decontaminate those surface areas in question until the levels of PCBs, lead and/or dioxins are below the threshold clean-up standards for the site, at no additional cost.

**1.19 ALTERNATE 18 (ADD) - Site Decontamination - Scarification**

- A. For providing labor, materials and equipment to scarify designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal for the preceding work, which shall be full compensation for all labor, equipment, materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of square feet scarified.
- C. The Contractor is advised that each scarified surface area will be measured only once, following the initial decontamination work. Should additional decontamination efforts be required, the Contractor shall provide the personnel, labor, materials and equipment to decontaminate those surface areas in question until the levels of PCBs, lead and/or dioxins are below the threshold clean-up standards for the site, at no additional cost

**1.20 ALTERNATE 19 (ADD) - Encapsulation**

- A. For providing labor, materials and equipment to encapsulate designated building structures and concrete pavement at the site.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the total number of square feet encapsulated.
- C. The Contractor is advised that each encapsulated surface area will be measured only once, following the initial encapsulation work. Should additional encapsulation effort be required, the Contractor shall provide the personnel, labor, materials and equipment to encapsulate the surface area in question until the levels of lead, PCB, and/or dioxins are below the threshold clean-up standards for the site.

**1.21 ALTERNATE 20 (ADD) - Liquid Hazardous Waste Disposal to a TSDF**

- A. For the loading, transportation and disposal of liquid hazardous wastes generated as a result of the decontamination work to a RCRA permitted TSDF.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken of the actual tonnage of liquid waste disposed on the basis of weigh slips.

**1.22 ALTERNATE 21 (ADD) - Contaminated Soil Disposal**

- A. For the excavation, stockpiling, loading, transportation and disposal of contaminated soil to a RCRA permitted TSDF.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken of the actual tonnage of contaminated soils disposed on the basis of weigh slips.

**1.23 ALTERNATE 22 (ADD) - Fence Installation and Repair**

- A. For the installation and repair of a permanent chain link fence following the completion of all the work.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken of the total linear feet of permanent chain link fence repaired and installed at the site.

**1.24 ALTERNATE 23 (ADD) - Borrow**

- A. For delivery and placement of borrow as backfill for contaminated soil excavation, including all labor, materials and equipment.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. In-place measurement shall be taken, of the actual number of cubic yards of borrow delivered and placed.

**1.25 ALTERNATE 24 (ADD) - Topsoil**

- A. For the delivery and placement of topsoil at the site, including all labor, materials and equipment.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken in place of the number of cubic yards of topsoil delivered and placed.

**1.26 ALTERNATE 25 (ADD) - Seeding**

- A. For the labor, equipment and materials required to seed the disturbed areas as a result of soil excavation operations.
- B. The Contractor will be paid the unit price as written in the proposal form for the preceding work, which shall be full compensation for all labor, equipment and materials as required or incidental to the carrying out of the work specified. Measurement shall be taken of the number of square feet of area seeded in place.

**END OF SECTION**

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**SECTION 01027**

**APPLICATIONS FOR PAYMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Comply with procedures described in this Section when applying for progress payment and final payment under the Contract.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, Special Provisions, and Sections in Division 1 of these Specifications.
  - 2. The Contract Sum is as described in the Litton Systems, Inc. - Contractor Agreement.

**1.02 QUALITY ASSURANCE**

- A. Secure the Engineer's approval of the schedule of values required to be submitted under Section 01370 of these Specifications.
- B. During progress of the Work, modify the schedule of values as approved by the Engineer to reflect changes in the Contract Sum due to Change Orders or other modifications of the Contract.
- C. Base requests for payment on the approved schedule of values.

**1.03 MEASUREMENT**

- A. Measurement for payment for the work shall include the furnishing of all labor, materials, equipment, and incidentals required for the Demolition and Site Remediation of the Lake Salvage Facility in its entirety as shown on the Plans and as specified under Division 1, and 2.

**1.04 PAYMENT**

- A. Payment under the Litton Systems, Inc. - Contractor Agreement shall fully compensate the Contractor for furnishing all labor, materials, and equipment and incidentals required to complete the work and shall be paid upon substantial completion of the cleanup and demolition of the building - April 19, 1995 - Waste Characterization/Disposal - June 21, 1995. A ten percent (10%) retainage will be held until July 20, 1995 or until the

confirmatory sampling analysis data is available and reviewed by the Engineer. The 10% retainage will be paid to the Contractor upon satisfactory final completion of the project.

## **1.05 PROCEDURES**

- A. Informal submittal: Unless otherwise directed by the Engineer:**
  - 1. Make an information submittal of request for payment by filling in, with erasable pencil, pertinent portions of AIA Document G702, "Application and Certificate for Payment," plus continuation sheet or sheets.
  - 2. Make this preliminary submittal to the Engineer for review.
  - 3. Revise the preliminary submittal as approved by the Engineer and incorporate the approved payments into the formal submittal.
- B. Formal submittal: Unless otherwise directed by the Engineer:**
  - 1. Make formal submittal of request for payment by filling in the agreed data, by typewriter or neat lettering in ink, on AIA Document G702, "Application and Certificate for Payment," plus continuation sheet or sheets.
  - 2. Sign and notarize the Application and Certificate for Payment.
  - 3. Submit the original of the Application and Certificate for Payment, plus six identical copies of the continuation sheet or sheets, to the Engineer.
  - 4. The Engineer will compare the formal submittal with the approved informal submittal and, when approved, will sign the Application and Certificate for Payment, and will forward to Litton Systems, Inc. for processing.

**END OF SECTION**

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**SECTION 01300****SUBMITTALS****PART 1 GENERAL****1.01 SECTION INCLUDES**

This section specifies the general methods, formats, and requirements for the submission of the following work and product related documentation:

- A. Equipment Listing and Manufacturers Qualifications
- B. General Work Plan (Project Approach)/Time Schedule
- C. Product Data
- D. Regulatory Compliance Program
- E. Permits and Notifications (Some Initial notifications made by Owner).
- F. Shop drawings required for all sealing of structures.
- G. Schedule of Values (01370).
- H. Health & Safety Plan
- I. Other Submittals as Required
- J. Worker's Licenses for each Specific Task
- K. All personal air sampling test results.
- L. Manifests, shipping slips, or other related documents.
- M. Record of quantities of materials removed from site.

**1.02 RELATED SECTIONS**

- A. Documents affecting work of this Section include, but are not necessarily limited to, the General Conditions, Supplementary Conditions, and all Sections of these Specifications.
- B. Section 01700 - Contract Closeout

### **1.03 MEASUREMENT AND PAYMENT**

- A. No separate measurement or payment will be made for work included in this Section. All costs in connection therewith shall be considered incidental to the Contract Bid Price.

### **1.04 PRODUCT LISTING AND MANUFACTURERS QUALIFICATIONS**

- A. Within five (5) calendar days after execution of the Notice to Proceed, the contractor shall submit to the Engineer the names and addresses of the manufacturers and suppliers of all materials and equipment he proposes to incorporate into the work. The Contractor shall also submit data relating to the materials and equipment he proposes to incorporate into the work in sufficient detail to enable the Engineer to identify and evaluate the particular product and to determine whether it conforms to the Contract requirements. Such data shall be submitted as specified in the Work Plan.

### **1.05 SHOP DRAWINGS, PRODUCT DATA, SAMPLES**

- A. Shop Drawings
  - 1. Shop drawings, as defined in the General Conditions, and as specified in individual work Sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation drawings, schedule information, piece part drawings, actual shopwork manufacturing instructions, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certification, as applicable to the Work.
  - 2. All shop drawings submitted by Suppliers for approval shall be sent directly to the Contractor for preliminary checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials. The Contractor shall be solely responsible for the coordination of submittals for related or interdependent equipment; fragmented submittals will not be accepted for review by the Engineer.
  - 3. The Contractor shall check all shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the drawings and Specifications. Drawings found to be inaccurate, not in compliance, or otherwise in error shall be returned to the subcontractors for correction before submission to the Engineer. Drawings which are current shall be marked with the date, name, and approval stamp of the Contractor.

4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made by the Contractor and noted on the drawings before being submitted for approval.
5. Shop and working drawings shall be prepared on standard size, 24" by 36" sheets. Drawings shall be clearly marked with the names of the Owner, Contractor, and building, equipment or structure to which the Drawing applies and shall be suitably numbered. All drawings for structural, building construction, and process equipment shall be true scale. Drawings not to scale will be returned "Rejected."
6. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and approved as conforming to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the work shall then be as shown in and represented by said drawings.

Until the necessary approval has been given, the Contractor shall not proceed with any portion of the work (such as the demolition of the building), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which approval is required.

The Engineer's approval of shop and working drawings, etc., will be general only and shall not relieve or in any respect diminish the responsibility of the Contractor for details of design, dimensions, etc. necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and specified performance specified thereunder.

Should the Contractor submit for approval equipment that requires modifications to the structures, piping, layout, etc. detailed on the drawings, he shall also submit for approval detail of the proposed modifications. If such equipment and modifications are approved, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.

**B. Product Data**

1. Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's print statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curve and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing, and printed product warranties, as applicable to the Work.

**C. Samples**

1. Samples specified in individual Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and units of work to be used by the Engineer for independent inspection and testing, as applicable to the Work.
2. Submit samples sufficiently early to permit consideration, inspection, testing, and approval before the materials and equipment are needed for incorporation in the work. After approval, the materials and equipment used in the work shall conform in all regards to the approved samples.

**1.06 CONTRACTOR'S RESPONSIBILITIES****A. Review shop drawings, product data, and samples prior to submission and verify and determine:**

1. Field measurements
2. Conformance with the Specifications. The Contractor shall advise the Engineer in writing of any deviations from the requirements of the Contract documents.

**B. Provide submittal identification and information including:**

The date of submission and dates of previous submissions, project title, contractor identification, specification section, manufacturer and supplier,

identified field dimensions, applicable standards and identification of deviations from Contract requirements. In addition, samples shall be identified with application, finishes, materials, and supplier.

- C. Provide five (5) sets of shop drawings and product data, two (2) of which are to be retained by the Engineer. A maximum of three sets will be returned by the Engineer with notations to the Contractor. Provide the number of samples requested in the respective specification sections.
- D. Apply Contractor's stamp, initials, or signature certifying that the submission has been thoroughly reviewed for completeness, compliance with Contract requirements, coordination with adjacent construction and dimensional compatibility. Items submitted without the stamp or that are incomplete will be returned by the Engineer for rework and resubmission.
- E. Document variations with contract documents and product or system limitations which may be detrimental to successful performance of the work. Coordinate the shop drawings with the requirements of other sections and subcontractors whose work is related to and required for proper and complete installation of the work.
- F. Provide space for the Engineer's review stamps and comments. The Engineer will review shop drawings for design, general methods of construction and detailing. This review shall not be construed as a complete check nor does it relieve the Contractor from responsibility for any departures or deviations from the requirements of the contract documents unless he has, in writing, called the Engineer's attention to such deviations at the time of submission. The Engineer's review of the shop drawings shall not relieve the Contractor from the responsibility for proper fitting of the work, or the responsibility of furnishing any work required by the contract documents which may not be indicated on the shop drawings. The Contractor shall be solely responsible for any quantities shown on the shop drawings.
- G. Submissions shall be accompanied by a transmittal form referencing the project name and applicable specification section. The numbering system shall be Sxxx with consecutive numbering. Resubmittals shall bear the same transmittal number but shall bear a letter suffix commencing with "A".
- H. Revise and resubmit submittals as required and identify all changes made since last submittal.
- I. Distribute copies of reviewed submittals to concerned parties with instructions to promptly report any inability to comply with the provisions or integrate the requirements with interfacing work.

#### **1.07 GENERAL PROCEDURES FOR SUBMISSION AND RESUBMISSION OF SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES**

- A. Coordination:** Prepare and submit documentation in advance of fabrication and product manufacturer, so that the installation will not be delayed, other related work can be properly coordinated, and there is adequate time for review and resubmission, if required. No extension of time will be authorized due to the Contractor's failure to provide approvable submittals sufficiently in advance of the work.
- B. Resubmission:** Make corrections and modifications required by the Engineer and resubmit until approved. Clearly identify changes made to shop drawings and product data and indicate other changes which have been made other than those requested by the Engineer. Submit new samples.
- C. Distribution:** Distribute approved submittal shop drawings and approved submittal product data to the project site and elsewhere as required to communicate the information to suppliers, Contractors, and field personnel. Samples will be retained by the Engineer on the job site.

#### **1.08 CERTIFICATES OF COMPLIANCE**

- A. Provide sworn certificates from the manufacturer or material supplier that the materials and fabrications provided under the section conform with the pertinent plans, special provisions and specifications of the contract and processing, product testing and inspection of materials are in conformance with all applicable specifications, drawings and/or standards of the Articles furnished. Certificates of Compliance shall be submitted in triplicate when requested by the Engineer or required by the individual Sections of the Specification. Certificates shall be signed by an officer of the Corporation and witnessed by a Notary Public.**

**END OF SECTION**

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**SECTION 01370****SCHEDULE OF VALUES & OPERATION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Provide a detailed breakdown by elements of work values allocated to each of the various parts of the work. The Engineer may determine the level of detail required. The schedule of values of the basis for the format of payment requests on AIA Document G702 "Application and Certificate for Payment."
- B. Submit and obtain approval from the Engineer for a schedule of operations within five days after the date of the Notice to Proceed. The Contractor is advised that the initial work (site cleanup and demolition) must be completed within the 14 calendar days from the project start date.
  - 1. The schedule shall reflect the proposed methods, the sequence of work, and the time of completion of the various phases of the work within the completion time specified in the Contract.

The schedule shall be detailed with daily activities and milestone completion dates. The schedule shall include but not be limited to the following activities:

- a. Submittal and agency approval timelines for permits, materials, and equipment.
- b. Mobilization for cleanup/demolition.
- c. Trailer procurement and installation.
- d. Site cleanup activities including preparation, cleanup, sealing, etc.
- e. Demolition activities including preparation, demolition, hauling, clean-up and site restoration.
- f. Waste characterization/disposal.
- g. Confirmatory sampling program.
- h. Contract close-out.

2. The schedule shall reflect the completion of all work including punch list work and performance and acceptance tests.
  3. The work shall be rescheduled by the Contractor if changes in the work scope alter the original schedule or he fails to comply with the original schedule. The revised schedule shall be submitted within 7 days of receipt of the Engineer's request.
- C. The following considerations shall be incorporated into the schedule of operations.
1. Site Preparation - Remove and relocate all site debris in preparation of the clean up effort.
  2. Building Demolition - The work shall start immediately upon receipt of the Notice to Proceed. The Contractor shall obtain all appropriate permits, as necessary.
  3. Site Remediation - Shall be ongoing in other areas of the site as demolition progresses unless problems with air sampling arise. There shall be no delay in the start of site cleanup.
- D. Prosecution of Work
1. The Contractor shall commence work within seven (7) calendar days after the issuance of the Notice to Proceed.
  2. Whenever, in the opinion of the Owner, the work is not proceeding in accordance with the construction progress schedule, the Contractor shall promptly take such measures as are necessary to return the work to its progress schedule, as directed by, and at no cost to, the Owner. Such measures shall include but not be limited to, employing additional or different personnel, equipment or construction methods, employing additional shifts, or working overtime. Such measures shall be continued until compliance with the progress schedule has been achieved. No additional charges will be allowed for such measures.
  3. In no event shall the contractor refuse to employ any such measure or measures as directed by the Owner or the Engineer. However, nothing contained herein shall be deemed to abridge or negate Contractor's rights under Article 19 of the General Conditions.
  4. Failure or refusal to employ such measures as directed by the Owner or the Engineer shall be deemed a material breach of the contract.



5. The foregoing is in addition to and not in limitation of any other provision contained in the Contract Documents.

E. The Contractor is advised that engineering monitoring and inspection will be periodically provided throughout the duration of this Contract by the Engineer. A Project Manager (PM) will maintain management responsibilities of the contract and related activities. The Project Manager will provide representation at the site on an as needed basis, monitoring of the contract activities including advice, coordination, problem resolution, progress measurement, communication with agencies and evaluation of the contractor's performance. Review of submittals for payment shall be performed by the Engineer who is on-site at the time the work is completed.

## **1.02 RELATED SECTIONS**

A. Documents affecting the work in this Section include but are not necessarily limited to General Conditions, Supplementary Conditions, Special Provisions and all Sections of these specifications.

## **1.03 SUBMITTALS**

A. Within five (5) days after receipt of the Notice to Proceed submit a proposed schedule of values. Secure the Engineer's approval of the schedule prior to submitting the first application for payment.

## **1.04 QUALITY ASSURANCE**

A. When required by the Engineer, provide copies of other subcontracts or other data acceptable to the Engineer which substantiate the schedule of values.

## **1.05 MEASUREMENT AND PAYMENT**

A. No separate measurement or payment will be made for work included in this Section. All costs in connection therewith shall be considered incidental to the Contract Bid Price.

**END OF SECTION**

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**SECTION 01500**

**CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. This Section describes construction facilities, temporary utilities, and controls required for the work.
- B. Temporary office facilities for the Engineer and Owner will be required for this Contract.
- C. Other work as identified in Section 01025.

**1.02 RELATED SECTIONS**

- A. Documents affecting work of this Section include, but are not necessarily limited to, the General Conditions, Supplementary Conditions, Special Provisions, and all Sections of these Specifications.
- B. This Section supplements the requirements of Article 3.10, of the General Conditions. In the event of conflict, this Section takes precedence.
- C. Section 01700 - Contract Closeout.
- D. Section 02070 - Selective Demolition.
- E. Section 02080 - Hazardous Materials Abatement
- F. Section 01300 - Submittals
- G. Section 02220 - Site Cleanup, Excavation, Backfilling and Compacting

**1.03 MEASUREMENT AND PAYMENT**

- A. No separate measurement or payment will be made for work included in this Section. All costs in connection therewith shall be considered incidental to the Contract Bid Price.

**1.04 QUALITY ASSURANCE**

- A. Maintain temporary facilities and controls in proper and safe condition throughout the progress of the Work.

## **1.05 TEMPORARY UTILITIES**

- A. Water Service - Provide temporary services at locations that permit hose access to the demolition sites. Adequate water shall be provided for cleanup, dust control, and emergency fire control. The water sources shall be metered. All water service connections shall be equipped with backflow preventers. Backflow preventers shall operate on reduced pressure principle and consist of shut off valves on inlet and outlet and strainer on inlet. Assemblies shall include test cocks, and pressure-differential relief valve located between 2 positive seating check valves, and be approved for use in the State of Illinois, similar to those manufactured by: Hershey Products, Inc., ITT Lawler, Watts Regulator Co. Upon completion of the work, remove the temporary services entirely.
- B. Telephone Service - Provide, maintain and pay for telephone service to Contractor's field office (cellular or wire) and telephone service to the Engineer's field office.
- C. Temporary Sanitary Facilities - Provide and maintain portable facilities and enclosures at the site.
- D. Electrical - Provide temporary electrical services as necessary.

## **1.06 CHAIN LINK FENCING**

- A. A fence is currently surrounding the site. During building demolition, additional temporary fencing may be required during the execution of the work. Contractor shall maintain this fence for security. Upon completion of demolition, and site decontamination, the existing fence shall be repaired and new fence sections shall be installed to provide permanent site security, under Alternate 13.

## **1.07 DRAINAGE**

- A. Refer to the Work Plan for sealing of the existing drainage system prior to the start of work.
- B. Permit the site to freely drain to the collection tank shown on the plan without interference with stockpiled rubble and demolition debris.

## **1.08 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas and open excavations. Provide barriers to protect existing facilities and adjacent property from damage from demolition operations. Provide warning signs and other temporary construction safety devices necessary

for proper completion of the work in compliance with pertinent safety regulations.

#### **1.09 RODENT CONTROL**

- A. Prior to commencing and during demolition, the Contractor shall employ a certified rodent and vermin exterminator and treat the buildings to be demolished (if required) in accordance with City and State health requirements.

#### **1.10 CONTRACTOR'S USE OF THE PREMISES**

- A. Access to the site and use of all existing facilities by the Contractor shall be in strict accordance with all regulations, policies, licenses, guidelines, and permits required by local, State, and Federal agencies.
- B. Existing facilities damaged by the Contractor and designated to remain after construction, shall be repaired by and at the expense of the Contractor. Repaired facilities shall be restored to a condition meeting or exceeding their original integrity.
- C. The Contractor shall, at his cost and expense, and in strict conformity with the Specifications and Drawings, furnish all sheeting, shoring, bracing, scaffolding, tools, derricks, tackle, implements, machinery, and appliances of every kind necessary to properly perform the Work.
- D. Comply with Section 1700 for final clean-up requirements.

#### **1.11 FIRE PROTECTION**

- A. Take all precautions necessary to prevent fires.
- B. Fuel for cutting and heating torches shall be gas only and shall be contained in UL approved containers.
- C. Provide and maintain fire extinguishers in accordance with the Health and Safety Plan and in the immediate vicinity where welding tools or torches of any type are in use. The fire extinguisher shall be a type appropriate for the fire hazards of the work area. Contractor shall provide a fire watch during times of welding or burning near combustible materials.
- D. Fire protection shall be provided from the nearest fire hydrant located on West Lake Street. The Contractor shall provide sufficient 4 inch hose, connections, nozzles and other equipment necessary to provide fire protection for the work areas at all times. Fire protection equipment provided by the Contractor shall satisfy the requirements of the City of Chicago Fire Department.

## **1.12 WATER SUPPLY**

### **A. Temporary Drinking Water**

1. Provide adequate potable drinking water, so piped or transported as to keep it safe and fresh, and served from single service containers or satisfactory types of sanitary drinking stands or fountains.
2. Provide all such facilities and services in strict accordance with applicable health regulations.

**B.** All water for construction purposes, as well as the means of having the water conveyed about the work, shall be provided by the Contractor and the cost of this work shall be included in the lump sum price stipulated for the work to be done under this Contract. The source, quality and quantity of water furnished shall at all times be satisfactory to the Engineer.

**C.** Water shall be provided for hot and cold showers for the trailer as required in the Health & Safety Plan.

## **1.13 ELECTRIC POWER**

**A.** The Contractor shall be responsible for arranging and providing and paying for power to operate construction equipment, temporary lighting, weather protection, heating, etc. Obtain all permits, pay all charges and comply with applicable codes of jurisdictional authorities and OSHA.

**B.** The Contractor shall provide and pay for sufficient electric lighting so that all work may be done in a workmanlike manner when there is not sufficient daylight.

## **1.14 WASH PAD**

**A.** The Contractor shall install a wash pad to be located in the field and as detailed on plans. The Contractor shall perform all necessary work required to achieve a watertight basin and shall maintain the structure through the life of the Contract. All outgoing vehicles shall drive through the wash pad to avoid tracking soil and debris from the Lake Salvage site. The Contractor shall direct the wash pad overflow to the temporary collection tank.

## **1.15 TRAILER**

**A.** Contractor shall provide a trailer in accordance with Section 02080 Part 3.04(1) and 3.04(7) of this specification.

**1.16 SECURITY**

- A. Security of the site must be maintained at all times during the demolition project, particularly during off hours (i.e. non-work hours). The Contractor shall provide round the clock monitoring of the site to ensure there is no unauthorized access during off hours. The City of Chicago Police and Fire Department may assist in monitoring the site and arrangement for site security shall be made by the Contractor prior to the start of the project. The Contractor shall maintain a radio communication system for the workers and the Engineer. Further, telephone (wire and cellular) must be provided to the site in the event of an emergency and to notify the police of trespassers.

**END OF SECTION**

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**SECTION 01600**

**CONTROL OF MATERIALS AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes providing labor, equipment, and facilities to properly inspect, inventory, unload, handle, and store materials and equipment to be incorporated in the Work.

**1.02 RELATED SECTIONS**

- A. Additional information regarding submittals is included in Section 01300.

**1.03 MEASUREMENT AND PAYMENT**

- A. No separate measurement or payment will be made for work included in this Section. All costs in connection therewith shall be considered incidental to the Contract Bid Price.

**1.04 SOURCE OF SUPPLY AND QUALITY OF MATERIALS**

- A. The source of supply of each material shall be approved by the Engineer before delivery is started. The Contractor shall furnish all material required for the Work specified in the Contract, and materials shall meet the requirements of the Specifications for the kind of work involving their use.
- B. Only new and first quality materials, conforming to the requirements of these Specifications and approved by the Engineer shall be used in the Work unless otherwise specified (i.e. reuse of fence). If, after trial, it is found that sources of supply which have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved materials from other approved sources. Facilities and labor for the storage and handling of all materials and equipment shall be furnished by the Contractor. Defective materials and equipment shall be removed immediately from the site of the Work, at no additional cost to the Owner. The Contractor may be required to furnish sworn certificates as to quality and quantity of materials before materials are incorporated in the Work. No material shall be processed or fabricated for the Work or delivered to the work site without prior concurrence of the Engineer.

- C. In accordance this specification, the Contractor shall submit to the Engineer sufficient detailed data to define the product and document conformity to the Specifications. Data shall be submitted on all materials and equipment proposed to be incorporated in the Work for both temporary and permanent application.
- D. Any delay of approval resulting from the Contractor's failure to submit samples or data promptly shall not be used as a basis of a claim against the Owner.
- E. All materials, workmanship, and equipment used in the Work shall correspond to the approved samples and approved submittal data.
- F. The Engineer shall choose between surface finishes, textures, and types. The Contractor shall demonstrate the proficiency and skills of workmen to provide samples of finish, textures, and types of surfaces as required.

## **PART 2 PRODUCTS**

Not Used

## **PART 3 EXECUTION**

### **3.01 PACKAGING, HANDLING, AND STORAGE OF MATERIALS**

- A. Materials and equipment shall be progressively delivered at the site so there will be neither delay in progress of the Work nor an accumulation of material that is not to be used within a reasonable time.
- B. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
  - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
  - 2. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to the manufacturer, grade, quality, source, and other pertinent information.
- C. Except as otherwise approved by the Engineer, determine and comply with the manufacturer's recommendations on product storage, handling, and protection. Provide manufacturer's documentation on recommended storage procedures when requested by the Engineer.
- D. Materials and equipment to be incorporated in the Work shall be handled and stored by the manufacturer, fabricator, supplier, and Contractor



before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft, or damage of any kind to the material or equipment.

- E. Finished surfaces including concrete walls shall be protected from damage until accepted by the Engineer.
- F. Materials which, in the opinion of the Engineer, have become damaged or are unfit for the use intended or specified, shall be promptly removed from the site of the Work, and compensation shall not be received by the Contractor for the damaged materials or their removal costs.
- G. The Contractor shall handle, haul, and distribute all materials and all surplus materials on the different portions of the Work, as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the Work, and be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the Work.
- H. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.
- I. Familiarize workmen and subcontractors with hazards associated with materials, equipment, and chemicals specified herein and take all necessary safety precautions.
- J. All materials and equipment to be incorporated in the Work shall be placed so as to not damage any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to the Owner.
- K. The Contractor shall provide all the required facilities and shall store all equipment to become part of this project in complete accordance with the respective manufacturers' and suppliers' recommendations. All equipment shall be properly stored and protected immediately upon its arrival and all consideration for potentially lengthy storage periods shall be made. All equipment shall be stored in a clean, dry, heated indoor facility (buildings, trailers, etc.). Outdoor storage with plastic, canvas, plywood or other cover will not be allowed except where specific approval for designated items not containing electrical components or bearings is obtained from the Engineer without relieving the Contractor of any part of the full responsibility for its proper protection. Moisture control shall be considered where appropriate.

No item judged rusty, corroded or otherwise damaged during storage will be accepted. Items not properly stored shall not be considered for any partial payment.

- L. Areas available on the construction site for storage of material and equipment shall be as shown or approved by the Engineer and shall be limited to within the Contractor's work limits, unless otherwise approved by the Engineer. None of the Contractor's material or equipment will be permitted to be stored in any of the Owner's facilities, unless otherwise approved by the Engineer. In addition, none of the Contractor's material or equipment will be permitted to be stored in any wetland areas or environmentally sensitive area. Stockpile sites shall be level, devoid of mature stands of natural vegetation, and removed from drainage facilities and features, wetlands, and stream corridors.
- M. Provide protective maintenance during storage consisting of manually exercising equipment where required, inspecting mechanical surfaces for signs of corrosion or other damage, lubricating, applying any coatings as recommended by the equipment manufacturer as necessary for its protection and all other precautions necessary to assure proper protection of all equipment stored.
- N. Ferrous surfaces not receiving finish coats of paint shall be treated with rust preventive coating, and non-ferrous metal work and devices shall be protected with suitable wrappings.
- O. Contractor shall be fully responsible for loss or damage to stored materials and equipment.

### 3.02 INSPECTION OF WORK

- A. Work to be done away from the construction site is subject to inspection on behalf of the Owner during its fabrication, manufacture, or testing, or before shipment. The Contractor shall give notice to the Engineer for the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

### 3.03 QUALITY ASSURANCE

- A. Prior to submitting shop drawings, the Contractor, with his subcontractors and suppliers, shall review all contract Drawings and Specifications with respect to specific system characteristics, applicability of materials and equipment for the intended purposes, sizes, orientation, and interface with other systems, both existing and proposed, and certify that the materials and equipment proposed will perform as specified.

- B. Furnish components to manufacturer's standard for service intended unless otherwise indicated or specified.

**END OF SECTION**

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**SECTION 01700****CONTRACT CLOSEOUT****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Documentation for Completed Work
- B. Final Clean-up
- C. Materials, Workmanship, Guarantee
- D. Time Deadlines

**1.02 RELATED SECTIONS**

- A. Documents affecting work of this section include, but are not necessarily limited to, the General Conditions, Supplementary Conditions, and all Sections of these Specifications.

**1.03 MEASUREMENT AND PAYMENT**

- A. No separate measurement or payment will be made for work included in this Section. All costs in connection therewith shall be considered incidental to the Contract Bid Price.

**1.04 SUBSTANTIAL COMPLETION**

- A. Procedure
  - 1. Prior to requesting final inspection and project close-out, the Contractor shall assure that the work is completed in accordance with the specified requirements and is ready for the requested inspection.
  - 2. Within a reasonable period of time after receipt of the request, the Engineer will inspect the work to review compliance, completeness, and issue a listing of unsatisfactory work. The Contractor will remedy the deficiencies and the work will be reinspected.
  - 3. The substantial completion dates shall be as follows:

April 19, 1995	Decontamination and Building Demolition
June 21, 1995	Waste Characterization/Disposal
July 20, 1995	Confirmatory Sampling/Analytical Data

## **1.05 PROJECT CLOSEOUT DOCUMENTS**

- A. The closeout submittals include but are not necessarily limited to:**
  - 1. Evidence of payment and release of liens.**
  - 2. Waste shipment manifests or shipping records.**
  - 3. Records of quantities of materials shipped off-site.**
  - 4. All other records or documents as necessary (i.e. personal air sampling records, injury reports, etc.)**
  - 5. As built plans showing final site conditions upon completion of work.**

## **1.06 FINAL CLEANING**

- A. Where material or debris has washed or flowed or has been placed in existing watercourses, ditches, gutters, drains, pipe, or structures, for work done under the Contract work limits or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed during the progress of the Work, and the ditches, channels, drains, pipes, structures, and work, etc. shall, upon completion of the Work, be left in a clean and neat condition.**
- B. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly, and as practicable, as work progresses, and shall not be left until the end of the contract period.**

## **1.07 FINAL COMPLETION**

- A. The Contract shall be considered complete and final payment made, only when:**
  - 1. All provisions of the Contract Documents have been strictly adhered to.**
  - 2. The project and premises have been left in good order, including removal of all temporary construction, Contractor-owned and extraneous materials as required.**

3. **Materials, Workmanship and Guarantee** - The Contractor guarantees that the Work and Services to be performed under the Contract, and all workmanship, materials and equipment performed, furnished, used, or installed in the construction of the same, shall be free from defects and flaws, and shall be performed, and furnished in strict accordance with the Drawings, Specifications and other Contract Documents, that the strength of all parts of all manufactured equipment shall be adequate and as specified and that the performance test requirements of the Contract shall be fulfilled. This guarantee shall be for a period of one year from and after the date of completion and acceptance of the Work as stated in the final agreement.

If at any time within the said period of guarantee any part of the Work requires repairing, correction or replacement, the Owner may notify the Contractor in writing to make the required repairs, correction, or replacements. If the Contractor neglects to commence making such repairs, corrections or replacements to the satisfaction of the Owner within ten (10) days from the date of receipt of such notice, or having commenced, fails to prosecute such Work with diligence, the Owner may employ other persons to make the same, and all direct and indirect costs of making said repairs, correction or replacements, including compensation for additional professional services, shall be paid by the Contractor.

**END OF SECTION**

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**DIVISION 2**  
**SITE WORK**

**SECTION 02014****SITE INVESTIGATIONS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. This section describes previous site investigation at the site, to assist the contractor in cleanup, demolition, stockpiling, handling, and disposal during the work.
- B. Confirmatory site sampling is required following the completion of the clean-up and demolition work. Confirmatory sampling will be performed by the Engineer with the assistance from the Contractor.

**1.02 RELATED SECTIONS**

- A. This section is part of the contract documents and all general conditions, supplementary conditions and other specification sections of the document shall apply equally to this section.

**1.03 MEASUREMENT AND PAYMENT**

- A. Payment shall be lump sum in accordance with Item 1 on the bid form and Section 01025.

**1.04 PROJECT SITE CONDITIONS**

- A. Bidders shall visit the site and acquaint themselves with existing conditions.
- B. A limited site investigation was performed to determine the extent of surficial contamination at the site. Analytical results are summarized on Figures 3 through 7, located in the back of this manual.
- C. The surface at the site was determined to be contaminated in certain areas of the site. The Contractor shall prepare accordingly and perform all work in a safe and proper manner in accordance with applicable regulations.
- D. The Contractor is warned that the plans and specifications indicate conditions as they are believed to exist based upon limited site investigations. The investigations are not warranted or guaranteed in any way to represent the conditions that might exist. The Contractor is advised to make his own investigations as to the conditions which exist which may affect the work. All investigations must be conducted under the Owner's supervision.

**END OF SECTION**

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**SECTION 02030****UTILITY CAPPING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. The determination of the location of existing utility services located above and below ground and servicing the Lake Salvage facility.
- B. The capping, termination and discontinuance of the utilities prior to the start of demolition. Caps are to be permanent unless otherwise noted in the work plan.

**1.02 RELATED SECTIONS**

- A. Documents effecting the work of this section include but are not necessarily limited to the General Conditions, Supplementary Conditions, Special Provisions, and Sections in Division 1 of these Specifications.
- B. Section 01025 - Measurement and Payment
- C. Section 02070 - Demolition
- D. Section 02080 - Hazardous Materials, Abatement.
- E. Section 02220 - Site Cleaning, Excavation, Backfilling and Compacting.

**1.03 MEASUREMENT AND PAYMENT**

- A. Payment for this work shall be in accordance with Item 1 on the Bid Form and Section 01025.

**PART 2 PRODUCTS****2.01 CAPPING MATERIALS**

- A. Cast Iron/Ductile Iron Piping - Caps shall be cast or ductile iron and mechanical jointed of same diameter of pipe and secured with a minimum of two  $\frac{3}{4}$ " rod tie backs to split friction clamps. Caps are to be as manufactured by Clow, Dresser, Ford Meter Box or approved equal. Provide concrete thrust blocks.
- B. Storm and Sanitary Sewer - The Contractor shall place concrete plugs in abandoned sewers and storm drains which terminate at existing manholes.

The concrete plug shall fill the entire area where pipes enter system. Processed gravel shall be used to bring the areas to final grade.

- C. Copper, Iron Piping - Caps or plugs shall be permanent screwed or silver soldered cap fittings. Termination materials shall be of the same materials as the pipe.
- D. Electrical - Electrical terminations shall be in accordance with building codes and/or utility requirements.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Location - determine from field investigations and test holes the location of pipes to be capped.
- B. Coordinate utility shutdowns with the Engineer and the respective utility company. No shutdown is to occur without authorization. The Contractor shall not operate any valves or disconnect any electrical service until he has notified and coordinated this effort with the Engineer.
- C. Electrical - Electrical and phone services to the Lake Salvage site shall be terminated at the light pole closet to the facility. The temporary service located on the pole closest to the facility shall be left in place to provide service to the trailer. All terminations shall be completed at this pole upon completion of the project.
- D. Disconnect all utilities entering the site in accordance with the utility company and Building Code requirements. Obtain certifications of disconnection from each affected utility company and submit copies to the Engineer prior to backfilling.
- E. Electrical/Water - Electrical and water services to the site structures shall be disconnected and terminated at the road.
- F. Mark location of utilities and other important items discovered in the course of the work. Record on as-built site plans.

**END OF SECTION**

**SECTION 02070****SELECTIVE DEMOLITION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. The determination of the location of all existing utility services located above and below ground which service or pass through the site.
- B. The capping, termination and discontinuance of the utilities prior to the start of demolition. Caps are to be permanent unless otherwise directed by the Utility Company and/or the Engineer. Protect all other utilities from damage throughout the work.
- C. The abatement of rodents prior to demolition.
- D. Demolition of designated buildings or other structures to 6" below grade as shown on the plans. All footings and foundations that are greater than 6" below grade will be left in place. Building areas J and K are targeted for demolition. The location of these building areas is depicted on Figure 7, which is located in the back of this manual.
- E. Removal and lawful disposition of all demolished building, and miscellaneous debris and derelict equipment on the site.
- F. All pits resulting from demolition work shall be filled to grade with clean fill.
- G. Prior to any demolition work the Contractor shall remove the remnants of the compactor located in Building A and cover the existing pit with a 1 inch thick steel plate (H-20 loading). The plate shall be sealed to preclude seepage of cleaning fluids or wash waters into the pit.

**1.02 RELATED SECTIONS**

- A. Documents affecting the work of this Section include but are not necessarily limited to General Conditions, Supplementary Conditions, Special Provisions, and all Sections of these Specifications.
- B. Section 01025 - Measurement and Payment
- C. Section 01500 - Construction Facilities and Temporary Controls
- D. Section 02014 - Site Investigations

- E. Section 02030 - Utility Capping
- F. Section 02080 - Hazardous Material Abatement
- G. Section 02222 - Site Cleanup, Excavation, Backfilling and Compaction
- H. Section 02226 - Borrow
- I. Section 02920 - Topsoil
- J. Section 02936 - Seeding
- K. Work Plan (Appendix A)
- L. Health and Safety Plan (Appendix B)

### 1.03 MEASUREMENT AND PAYMENT

- A. Payment for work under this section shall be lump sum or unit price in accordance with the bid form and Section 01010 and the following Alternates:

Alternate 1: Demolition and stockpiling of the two (2) incinerators and existing ash piles.

Alternate 2: Removal and stockpiling of site litter.

Alternate 3: Demolition and stockpiling of building structures designated for disposal at a RCRA permitted TSDF.

Alternate 4: Demolition and stockpiling of building structures designated for disposal at a demolition landfill.

Alternate 5: Waste characterization of all stockpiled solid and liquid waste materials (except site litter) for disposal to an appropriate disposal facility.

Alternate 6: Off-site disposal of demolition debris and ash to a RCRA permitted TSDF.

Alternate 7: Off-site disposal of demolition debris to demolition landfill.

Alternate 8: Disposal of liquid wastes generated during the project to a POTW.

Alternate 9: Off-site disposal of site litter to a lined landfill.

**1.04 SUBMITTALS**

- A. Submit a time schedule with the bid indicating the demolition and removal sequence. Provide description of methods and equipment to be employed during demolition for each structure. All existing litter shall be removed and stockpiled on-site prior to demolition in accordance with Part 1.08.
- B. The Contractor shall comply with applicable state and federal regulations regarding transport and disposal of these materials. Proof of proper licensing and lawful disposal shall also be required. At a minimum, these shall include 35 IAC Parts 722, 723, 726 and 725. Testing of the waste materials shall conform to 35 IAC 721 and 728.

Federal regulations for the transportation and disposal of waste materials may be subject to the following regulations, amendments to the same and others:

- 1. DOT 49 CFR 172 thru 179.
- 2. DOT 49 CFR 387 (46 FR 3D974, 47073).
- 3. DOT-E 8876.
- 4. EPA 40 CFR 262, 263, 265, 266, 268.

It will be the contractor's responsibility to properly mark, label, package and manifest wastes as may be required by all applicable regulations, codes, ordinances, etc.

- C. The Contractor shall submit for approval, a detailed Hazardous Waste Handling Plan which he proposes to follow in removing and disposing of demolition debris, liquid wastes, sediments and sludges. The submittal shall include, but not be limited to, the following:
  - 1. Methods of on-site pretreatment, if any.
  - 2. Methods of truck loading.
  - 3. Methods of transportation and the name of the transport company.
  - 4. Methods of treatment and ultimate disposal.
  - 5. Location and name of the company performing treatment and ultimate disposal.
  - 6. Methods by which the Contractor will ensure that no on-site spillage onto the ground will occur. If such an incident should

occur, the Contractor must cease all work and immediately contain all leaks. All contaminated soils, absorbent materials, etc. must be promptly removed, drummed, manifested and disposed of properly, at no cost to the Owner.

- D. Project Record Documents - Accurately record actual locations of capped utilities and subsurface obstructions encountered in the excavation. Provide as-built plans of all capped and terminated utilities indicating three horizontal ties and the elevation relative to a clearly identified, permanent datum.
- E. Submit certification of satisfactory capping from appropriate utility company prior to backfilling.
- F. Submit certification of lawful waste disposal.

#### 1.05 QUALIFICATIONS

- A. Demolition Firm: Company specializing in performing the work of this section with minimum of five years of experience.

#### 1.06 REGULATORY REQUIREMENTS

- A. Conform to all health and safety regulations, including, but not limited to:
  - Site Health & Safety Plan
  - 29 CFR 1910.120
  - 29 CFR 1926
- B. Obtain all required approvals and secure all permits from applicable agencies including, but not limited to: City of Chicago Building Department, Environmental Protection Agency and Illinois Environmental Protection Agency. Additional permits or approvals may be required.
- C. Comply with all federal, state and local regulations applicable to demolition activities.
- D. Make all required notifications prior to starting work.
- E. Conform to applicable regulations, procedures and other specification sections when encountering hazardous or contaminated materials.
- F. Hazardous materials (lead, PCBs and dioxins) are present in the buildings. Therefore, cabs of equipment shall be pressurized with HEPA filtered air. HEPA is defined as high efficiency particulate air filters which are capable of 99.97% efficiency down to three micron sized particles. The Contractor shall comply with the following during demolition:

1. The Contractor shall form four separate stockpiles of the demolition debris, each designated as follows:
  - a. Site litter
  - b. Incinerator structures and existing ash material.
  - c. Building structures most likely designated for off-site disposal at a RCRA permitted TSDF.
  - d. Building structures most likely designated for off-site disposal at a demolition landfill.
2. Water Use - Water use shall be minimized to the extent possible throughout the work area. All washwaters shall be directed to the collection tank. Work areas shall be sprinkled as necessary to minimize dust. Contractor shall ensure that all access routes are adequately wetted to prevent nuisance dust on a continuous basis.
3. Unknown Site Conditions - The information provided in the specifications is believed accurate but the Contractor should field verify. Equipment, piping, and interior facilities that can be visually inspected are not shown on the drawings. The Contractor shall perform his own inspection and appraisal of all equipment, piping and interior facilities to be demolished or removed for salvage.

#### 1.07 SITE CONDITIONS

- A. Included in the Contract Documents is a general site plan for the purpose of providing general information on the selected structures to be demolished. The information provided is not complete. Equipment, piping, wiring and interior facilities that can be visually inspected are not shown on the Drawings. The Contractor shall perform his own inspection and appraisal of all equipment, piping, wiring and interior facilities to be demolished or removed for salvage.

#### 1.08 SEQUENCING

- A. Sequence the work activities to demolish in the following order:
  1. Disconnect and cap utilities.
  2. Remove and stockpile existing litter found at the site in a designated area - (Alternate 2).

3. Commence demolition of the two incinerators and stockpile the debris in the designated area for removal off-site to a RCRA permitted TSDF. Include the collection and accumulation in drums of existing remaining ash material - (Alternate 1).
4. Commence demolition of designated building structures (J and K) and stockpile the debris according to probable off-site disposal: TSDF or demolition landfill - (Alternates 3 and 4).

## **PART 2 MATERIALS**

### **2.01 CAPPING MATERIALS**

- A. Material and devices for utility caps shall be selected to meet the requirements of the respective utility companies.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. The Contractor shall first remove all existing litter and stockpile it in a designated area.
- B. Protect existing structures which are not to be demolished.
- C. Protect drainage ways from sedimentation. The Contractor shall secure the existing storm catchbasin by plugging the outlet pipe with an inflatable plug. The storm drain structure shall serve as a collection point for any wastewater which may be generated in the decontamination phase of the project. The Contractor shall fashion a flexible funnel which will be affixed to the inner lip of the manhole opening. A 2' x 6' 6-mil polyethylene liner shall be formed into a tube approximately 2' in diameter. The tube shall be affixed to the inner lip of the manhole opening using twisted wire. Next, the Contractor shall place a 10 gallon polyethylene container into the manhole and fold the flexible funnel into the 10 gallon container.

All washwaters for the clean-up effort shall be directed to the collection tanks. Siltation cloth shall be employed for filtering debris. The Contractor shall install a submersible pump in the collection tank to pump the collected liquid into steel drums, provided by the Contractor for this purpose.

- D. Establish necessary utilities and temporary water service for use in clean-up, dust control and fire protection.
- E. Do not close or obstruct roadways or sidewalks.



**3.02 DEMOLITION**

- A. Locate and terminate utilities in accordance with Section 02030.
- B. Conduct demolition to minimize interference with adjacent structures not being demolished, other contractors, and adjacent properties.
- C. Keep work sprinkled with water to minimize dust. Provide hoses and water connections for this purpose.
- D. Remove above grade buildings including foundations and cement protrusions to six inches below existing grade. Demolished materials and equipment shall be stockpiled, characterized and disposed off-site.
- E. Blasting is not permitted.

**3.03 DISPOSAL OF DEMOLITION WASTE**

- A. The Contractor shall legally dispose of all materials from the demolition work. The loading of demolition materials shall be performed in a manner that prevents materials from entering the site drainage system.
- B. The Contractor shall provide evidence on a load-by-load basis that demolition materials have been received at a legal disposal, recycle, reuse or salvage location. The means for such proof may be truck weigh slips from an approved disposal facility or documentation of transfer of title or other means acceptable to the Engineer.
- C. Within 90 days after generation of the final volume of hazardous waste, all solid and hazardous waste will be identified, labeled, manifested, and transported in accordance with 35 IAC Parts 722, 723, 724, and 725 to a permitted special waste landfill or an off-site RCRA permitted treatment, storage, and disposal facility (TSDF), as appropriate. The maximum hazardous waste which will be generated as a result of the demolition work is unknown at this time. During the cleaning and decontamination process, the following wastes will be accumulated:
  - 1. Wash waters containing PCBs, dioxins and D008 waste accumulated during the washing of the concrete surfaces.
  - 2. Personal protective equipment and plastic used during the project.
- D. A hazardous waste determination shall be made on all waste as required by 35 IAC 721. If the waste exhibits the characteristics of hazardous waste, then, it must be managed as hazardous waste in full accordance

with the 35 IAC 721 and 728 and transported off-site within 90 days to be managed at a RCRA authorized permitted TSDF. If deemed non-hazardous waste and analytical results indicate compliance with other applicable regulations (i.e., local wastewater and solid waste regulations), then the waste can be disposed of accordingly (i.e., landfill or Publicly Owned Treatment Works (POTW) via tanker). For wastes which are transported to and discharged into the POTW treatment system or to the on-site evaporation tanks, advance approval or a permit will have to be provided by the POTW or IEPA.

### 3.04 TIME TABLE

- A. The Contractor shall be allowed two weeks for the demolition and clean-up work (April 5 through April 19, 1995) on this project.

### 3.05 PERSONNEL

- A. Contractor shall provide the following personnel for work activities at the site.

<u>Operation</u>	<u>Personnel</u>
Building Demolition and Hazardous Materials	- Site Health & Safety (OSHA 40 hour)
Outside Support (i.e. truck drivers)	- No Special License

### 3.06 LIST OF EQUIPMENT

- A. The Contractor shall provide the following equipment at the site to complete the work. The following is not intended to be a complete list of all necessary equipment.

1. Trailer - Provide a 720 SF (12' x 60') heated trailer which consists of partitioned areas equipped with:

#### Emergency Medical

- Eye wash
- First-aid kit
- Potable drinking water

#### Shower Area

- Minimum of 2 showers with hot and cold water
- Towel racks in drying area
- Benches

**Locker/Dressing Area**

- Lockers for street clothes storage
- Hooks and racks for clean outer wear
- Containers for clean disposable clothing
- Benches

2. **Personal Protective Equipment** - Provide protective clothing and respirators for each employee who is directly exposed to contaminants. Clothing and protective gear shall be on hand for Level C and D exposure. Provide adequate clothing for daily changes when required. Provide three additional sets of protective clothing for the Engineer, the EPA and Ecology and Environment representatives.
3. **Power Washer** - Provide one power washer for decontamination of heavy equipment leaving the site. Power washer shall be capable of delivering 8 gallons per minute of cold water with operating pressure of 2800 psi. Power washer shall be equipped with  $\frac{3}{8}$ " ID, 40 foot long hose and wand.
4. **Pump** - The Contractor shall provide a sump pump capable of adequately evacuating the collection tank throughout the project.
5. **Generator** - The Contractor shall provide an emergency generator at the site capable of operating all equipment on hand in the event of a power failure.
6. **Engineers Trailer** - The Contractor shall provide space in the trailer for use by the Engineer which shall include heat, electricity, phone and FAX machine. The space shall be large enough to lay out drawings and equipment and shall be at least 100 SF (10' x 10'). The contractor's trailer may be part of the decontamination facility and shall be monitored to ensure that clean areas remain uncontaminated. This will be accomplished by air sampling methods.
7. **Wash Pad** - The Contractor shall construct a wash pad capable of collecting all waste water during equipment/material washdown. Existing pavement at the site may be employed for this purpose. An asphalt berm shall be constructed around the decontamination pad area and all runoff shall be directed to the collection tank. Any holes in the pavement shall be patched. The conduit to the collection tank shall be an impervious surface or kept wet at all times.
8. **Water Distribution System** - Contractor shall provide sufficient hoses, pumps, sprayers, etc. to meet all water volume needs.

9. Plastic - Plastic sheeting shall be polyethylene with a thickness of at least 6-mil for all applications. The sheeting for the worker decontamination facilities shall be opaque or black in color.
10. Disposal Bags - Waste disposal bags for protective clothing, filters, etc. shall be 6-mil polyethylene or the equivalent, with appropriate labels.
11. Warning Signs - Warning signs shall be used to demarcate regulated areas and shall comply with appropriate regulations.
12. Respiratory Protection - All respiratory protection devices must have NIOSH approval. Half-mask air-purifying respirators with HEPA filters are the minimal protection required for demolition and cleaning operations.
13. Heavy Equipment - The Contractor shall provide the following heavy equipment at the site.
  - Small excavator such as Bobcat for the removal of site litter.
  - Hydro-pulp equipment to provide (if necessary) a 1/8" to 1/4" layer of wetted pulp during litter removal operations.
  - Metal shears capable of mechanically cutting all sizes of structural steel at the site.
  - Appropriately sized equipment to operate above attachments.
14. Other Equipment - The Contractor shall provide other equipment such as power equipment, machinery, scaffolds, hand tools and other items that will be necessary for the entire completion of the project.
15. Substitutions - If the Contractor wishes to make substitutions of material or equipment listed in these specifications, the proposed substitution shall be made known, in advance, to the Engineer. Technical data or other information must be provided in writing upon request of the Engineer during the evaluation of the proposed substitution. No substitution shall be made without the prior agreement in writing by the Engineer.

END OF SECTION

SECTION 02080

HAZARDOUS MATERIALS ABATEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Perform all work as described under this section as Alternates 10 through 21 but not limited to the following:
  - 1. All work including the decontamination, removal and disposal of hazardous materials. Waste characterization (testing) will be performed under Alternate 5, Section 02070.
  - 2. If necessary, the excavation, stockpiling, testing and disposal of 50 tons of contaminated soil. This item will be bid as Alternate 21 as defined in Section 01010.
- B. Work Plan (Appendix A).
- C. Comply with Health and Safety Plan (Appendix B).

1.02 RELATED SECTIONS

- A. This section is part of the contract documents, and all General Conditions, Supplementary Conditions, and other specification sections shall apply equally to this section.

1.03 MEASUREMENT AND PAYMENT

- A. Payment for all items except the excavation, stockpiling, testing, and disposal of contaminated soil shall be lump sum in accordance with the bid form and Section 01010 as follows:

Alternate 10: Wipe sampling and laboratory analyses of wipe samples following the various clean-up tests.

Alternate 11: Vacuum clean-up test(s).

Alternate 12: Power wash clean-up test(s).

Alternate 13: Chemical wash clean-up test(s).

Alternate 14: Scarification clean-up test(s).

Alternate 15: Decontamination of surface areas (walls and walkway surfaces) using vacuum clean-up methods to reach established clean-up standards.

Alternate 16: Decontamination of surface areas (walls and walkway surfaces) using power wash clean-up methods to reach established clean-up standards.

Alternate 17: Decontamination of surface areas (walls and walkway surfaces) using chemical clean-up methods to reach established clean-up standards.

Alternate 18: Decontamination of surface areas (walls and walkway surfaces) using scarification clean-up methods to reach established clean-up standards.

Alternate 19: Encapsulation of designated building walls to reach established encapsulation standards.

Alternate 20: Disposal of liquid wastes generated during the decontamination effort to a RCRA permitted TSDF.

Alternate 21: Removal and disposal of contaminated soils to a RCRA permitted TSDF.

#### 1.04 SUBMITTALS

- A. Provide list of equipment which will be used at the site.
- B. Provide certification of employee's baseline medical exam status.
- C. Health and Safety Plan.
- D. Copies of appropriate licenses and/or Certification.
- E. Hazardous Waste Handling Plan.
- F. Personal Air Sampling results.
- G. As-Built plans showing quantities and locations of removed material.
- H. Manifests, shipping slips, etc.
- I. Provide a final report documenting on-site activities.
- J. Other information as requested.

**1.05 QUALITY ASSURANCE**

- A. Conform in all regards to the minimum requirements of the Health and Safety Plan as set forth in the Contract Documents.

**1.06 EXPERIENCE**

- A. The Contractor shall have demonstrated experience performing similar projects in scope and nature and have 5 years experience performing hazardous materials work.

**1.07 REGULATORY REQUIREMENTS**

- A. Conform to all health and safety regulations including, but not limited to,
- Site Health & Safety Plan
  - 29 CFR 1910.120
  - 29 CFR 1926
- B. The Contractor shall comply with applicable state and federal regulations regarding transport and disposal of these materials. Proof of proper licensing and lawful disposal shall also be required. At a minimum, these shall include 35 IAC Parts 722, 723, 724, and 725. Waste characterization shall comply with IAC 721 and 728.

Federal Regulations for the transportation and disposal of waste materials may be subject to the following regulations, amendments to the same and others:

- a. DOT 49 CFR 172 thru 179.
- b. DOT 49 CFR 387 (46 FR 3D974, 47073).
- c. DOT-E 8876.
- d. EPA 40 CFR 262, 263, 265, 266, 268.

It will be the Contractor's responsibility to properly mark, label, package and manifest wastes as may be required by all applicable regulations, codes, ordinances, etc.

**PART 2 MATERIALS**

- A. Provide health and safety equipment which meets or exceeds all regulations or as specified in this plan.

## PART 3 EXECUTION

The following is a minimum work plan which has been developed for the site. Additional details may be found in the overall Work Plan for the site (Appendix A).

## 3.01 SURFICIAL DECONTAMINATION

- A. Designated building structures at the site require decontamination and/or encapsulation. Section 3.01 deals with surficial decontamination under Alternates 10 through 21. Table 1 summarizes the estimated surface areas which require decontamination from lead, PCBs, and dioxins. Figure 7, located in the back of this manual, depicts the various building areas.

TABLE 1  
LAKE SALVAGE SITE  
SURFACE AREA ESTIMATES

Building Area	Interior Walls (sq.ft.)	Floor (sq.ft.)	Ceiling (sq.ft.)	Exterior Walls (sq.ft.)	Total (sq.ft.)
A	2,775	2,700	2,700	2,250	10,425
A1	288	80	80	0	448
B	660	270	270	360	1,560
C	560	180	180	280	1,200
D	500	150	150	250	1,050
E	780	540	540	0	1,860
F	540	525	525	390	1,980
G	900	500	500	250	2,150
H	420	110	110	0	640
I	900	500	500	600	2,500
TOTAL BLDGS.	8,323	5,555	5,555	4,380	23,813
East Yard	0	8,970	0	0	8,970
Shipping Dock	0	1,575	0	140	1,715
West Yard	0	2,196	0	0	2,196
TOTAL YARDS	0	12,741	0	140	12,881
TOTAL SURFACE	8,323	18,296	5,555	4,520	36,694



**B. Execution**

1. The Contractor shall submit for approval a detailed hazardous waste handling plan which he proposes to follow during the decontamination procedures and in removing and disposing of liquid wastes, sediments and sludges. The submittal shall include, but not be limited to, the following.
  - a. Decontamination methods to be used at the site.
  - b. Methods of on-site pretreatment, if any.
  - c. Methods of truck loading.
  - d. Methods of transportation and the name of the transport company.
  - e. Methods of treatment and ultimate disposal.
  - f. Location and name of the company performing treatment and ultimate disposal.
  - g. Methods by which the Contractor will ensure that no on-site spillage onto the ground will occur. If such an incident should occur, the Contractor must cease all operations and immediately contain all leaks. All contaminated soils, absorbent materials, etc. must be promptly removed, drummed, manifested and disposed of properly, at no cost to the Owner.
2. Following the demolition work, the Contractor shall proceed with testing the effectiveness of the various clean-up methods followed by decontamination of the remaining building walls and concrete surfaces found at the Site. The Contractor shall hand-scrape any remaining debris materials and place them in bulk drums for off-site disposal.
3. The Contractor shall vacuum-clean the surface areas designated for decontamination and seal all visible cracks in the walking surfaces to prevent the seepage and migration of cleaning fluids and washwaters below the concrete pavement.
4. All contaminated surfaces shall be remediated to a clean surface by vacuuming, chemical or foaming agents, steam cleaning or other similar methods. All debris and appurtenant equipment (if not cleaned) shall be disposed of as a contaminated waste.

5. The Contractor shall use a previously selected and appropriate clean-up method such as power washing, vacuuming or chemical cleaning of the various site surfaces. All wastewaters will be directed into the manhole collection tank. The Contractor shall minimize the use of water during the power washing and rinsing operations. The collected washwater will be pumped into steel drums using a submersible pump. The wastewater will be characterized for disposal purposes under Alternate 5 and disposed of in accordance with applicable regulations under Alternate 20.
6. The Contractor will be required to provide a "clean debris surface" at the completion of the concrete cleaning. Clean debris surface means the surface, when viewed without magnification, will be free of all visible hazardous waste except that residual staining from waste consisting of light shadows, slight streaks or minor discolorations, and soil and waste in cracks, crevices and pits shall be limited to no more than 5 % of each square inch of surface area. The clean-up work shall generally meet the performance standards identified in 40 CFR Part 268.45.
7. The clean surface criteria shall meet clean-up thresholds summarized in Table 2.

TABLE 2 SITE CLEAN-UP THRESHOLDS			
	Surface		Soil
	Without encapsulation	With encapsulation	
Lead (walking surface)	(1) $\mu\text{g}/\text{cm}^2$	(1) $\text{mg}/\text{cm}^2$	400 $\text{mg}/\text{kg}$
Lead (walls)	(1) $\mu\text{g}/\text{cm}^2$	(1) $\text{mg}/\text{cm}^2$	NA
PCBs	10 $\mu\text{g}/\text{cm}^2$	100 $\mu\text{g}/\text{cm}^2$	1 $\text{mg}/\text{kg}$
Dioxins	2.67 $\text{pg}/\text{cm}^2$	26.7 $\text{pg}/\text{cm}^2$	(1)

Note: (1) to be determined

### 3.02 ENCAPSULATION

- A. Designated building structures at the site require decontamination and/or encapsulation. Section 3.02 deals with the encapsulation work under Alternate 19. Table 3 summarizes the estimated surface areas which require encapsulation. Table 2 includes site clean-up thresholds using encapsulation methods. The location of the various building areas is shown on Figure 7, located in the back of this manual.

TABLE 3  
LAKE SALVAGE SITE  
SURFACE AREA ESTIMATES

Building Area	Interior Walls (sq.ft.)	Floor (sq.ft.)	Ceiling (sq.ft.)	Exterior Walls (sq. ft.)	Total (sq.ft.)
E	100	0	0	0	100
I	250	0	0	200	450
TOTAL BLDGS.	350	0	0	200	550

**B. Execution**

1. The Contractor shall submit for approval a detailed hazardous waste handling plan which he proposes to follow during the encapsulation process and in removing and disposing of liquid wastes, sediments and sludges. The submittal shall include, but not be limited to, the following.
  - a. Encapsulation methods and materials to be used at the site including preparatory steps prior to the encapsulation work.
  - b. Methods of on-site pretreatment, if any.
  - c. Methods of truck loading.
  - d. Methods of transportation and the name of the transport company.
  - e. Methods of treatment and ultimate disposal.
  - f. Location and name of the company performing treatment and ultimate disposal.
  - g. Methods by which the Contractor will ensure that no on-site spillage onto the ground will occur. If such an incident should occur, the Contractor must cease all operations and immediately contain all leaks. All contaminated soils, absorbent materials, etc. must be promptly removed, drummed, manifested and disposed of properly, at no cost to the Owner.
2. All designated contaminated surfaces shall be encapsulated by removing loose debris from the surfaces by hand scraping and/or vacuuming methods and applying with a brush, roller or spray gun

the encapsulating agent or other similar methods. All debris and appurtenant equipment (if not cleaned) shall be disposed of as contaminated waste.

### 3.03 SOIL REMOVAL

- A. Soil excavation of contaminated soils is not anticipated, however, if at any time during the project it becomes necessary to excavate contaminated soil, the following provisions shall apply.
- B. Contaminated soils shall be stockpiled in a designated area lined with 6 mil polyethylene plastic. These stockpiles must also be covered at the end of each work day. Adequate plastic sheeting should be brought to the site at the start of the job. Plastic must be adequately weighted to prevent plastic from blowing off. Individual stockpiles of contaminated soil should be no larger than 100 cubic yards. Highly contaminated soils should be stockpiled separately from less contaminated soils.
- C. When all contaminated soil has been excavated, the Contractor shall perform sampling and analysis as required for disposal. At a minimum, the analysis shall include one complete soil characterization as outlined in Table 5. The Contractor shall complete all paperwork as necessary for manifesting the soil to a RCRA permitted TSDF.

### 3.04 CONFIRMATORY SAMPLES

- A. Confirmatory sampling shall be performed in accordance with 40 CFR 200.415(K) by the Engineer with the assistance from the Contractor. The Contractor will provide personnel and equipment to gain entry into two (2) West Lake Street storm drain manholes for the purpose of obtaining sediment samples.
- B. Further sampling and analysis may be required following the evaluation of the initial data. If deemed necessary, the Engineer will provide specific recommendations for further sampling in the Final Report which will be submitted to the US EPA, Region V.
- C. The background and confirmatory results will be statistically compared by the Engineer in the Final Report for each parameter using the Cochran's Approximation as shown in the Work Plan - Phase II. If the parameter value of the background and confirmatory samples are determined to be statistically insignificant for each parameter, then the location are deemed "clean" and decontamination is completed. However, if the parameter value between the background and confirmatory samples are statistically significant, then the decontamination operation (i.e., rinsing concrete surfaces) must continue at no additional cost to the Owner.

## 3.05 HAZARDOUS MATERIALS - GENERAL INFORMATION

- A. Hazardous materials in the form of ash dust contaminated with lead, PCBs and dioxins are present at the facility. Table 4 summarizes the various highest levels of contamination identified at the site.

<p align="center"><b>TABLE 4</b>  <b>HIGHEST KNOWN CONTAMINANT LEVELS</b>  <b>ENCOUNTERED AT THE SITE</b></p>				
Location	Media	Compound	Maximum Concentration	Sample Date
Waste Pile	Ash/Soil	Dioxin	156,000 pg/g	4/21/94
Waste Pile	Ash/Soil	Lead (TCLP)	62 mg/l	4/21/94
Waste Pile	Ash/Soil	Cadmium	0.36 mg/l	4/21/94
Waste Pile	Ash/Soil	Barium	1.3 mg/l	4/21/94
Waste Pile	Ash/Soil	Mercury	0.0059 mg/l	4/21/94
Waste Pile	Ash/Soil	PCB	16 mg/kg	4/21/94
Unknown	Wipe	Dioxin	19.5 pg/cm <sup>2</sup>	3/31/94
Unknown	Wipe	Dioxin	4.7 pg/cm <sup>2</sup>	3/31/94

pg/g or cm<sup>2</sup> - picrogram per gram or square centimeter.

<p align="center"><b>TABLE 5</b>  <b>PARAMETER TEST METHODS</b></p>	
Parameter	SW-846 Test Method
TCLP/Hazardous	Various Methods
Hazardous Waste Characteristics Method	
Polychlorinated Biphenyls (PCBs)	8080
Dioxins	8290
Lead	6010
RCRA	
Corrosivity	9040
Reactive Cyanide	9010
Reactive Sulfide	9030
Ignitability	1010

Note: Test Methods for Evaluating Solid Waste, EA-SW846, Third Edition, 1986.

**B. Hazardous Materials - Execution**

1. All hazardous materials shall be characterized and disposed of in accordance with applicable regulations. At a minimum, those regulations shall include 35 IAC 721 through 725 and 728 and the State of Illinois Regulatory Guidance Policies. Disposal manifests shall be provided for all waste disposal.
2. Workers who handle hazardous materials shall be licensed and trained in safe and proper hazardous materials handling procedures. At a minimum, this shall include OSHA-40 Hour Hazardous Waste Site Health and Safety Training in accordance with 29 CFR 1910.120.
3. Under Alternate 5, the Contractor shall be responsible for waste characterization of the various solid and liquid wastes stockpiled at the site as a result of the work. Waste characterization shall incorporate EPA approved test methods which are listed in Table 5.

**3.06 HEALTH AND SAFETY PLAN**

- A. The Contractor shall provide a site specific health and safety plan (HSP), which, at a minimum, shall address all issues outlined in the HSP located in Appendix B.

**3.07 NOISE CONTROL**

- A. The Contractor shall use every effort and every means possible to minimize noises caused by his operations, which may be considered objectionable.
  1. The Contractor shall provide working machinery and equipment designed to operate with the least possible noise.
  2. Compressors shall be equipped with silencers on intake lines. All gas or diesel operated equipment shall be equipped with silencers or mufflers on intake and exhaust lines.

3. Wherever practicable, electricity shall be used for power to reduce noise.
4. Examples of noise abatement measures include:
  - a. On-site measures such as physical sound barriers, sound retardant housings, engine mufflers, and minimal use of certain equipment.
  - b. Construction vehicle measures such as scheduling of truck loading, unloading and hauling operations so as to minimize noise impact on the community.
  - c. Maintenance of all equipment such that parts of vehicles and loads are secure against rattling and banging.
5. Comply with OSHA regulations pertaining to protection of worker's hearing.

### 3.08 NUISANCE DUST CONTROL

- A. Contractor shall provide control of nuisance dust or demolition dust at all times throughout the project.

END OF SECTION

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## SECTION 02220

### EXCAVATING, BACKFILLING, AND COMPACTING

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes

1. Excavating, backfilling, and compacting the site as required to complete the Work shown as specified herein.
2. Removing, handling, rehandling and disposing of any materials excavated including wire, metal, bricks, rock, organics and undesirable soils or debris.
3. Dewatering, sheeting, and bracing as required for the safety of employees and protection of existing structures on work previously completed.
4. Compacting soil materials utilizing approved methods and equipment to achieve not less than the minimum specified soil density.
5. Excavating and backfilling test pits at the locations requiring exploration for unknown tunnels, utilities and interferences.
6. All pits or openings shall be filled with clean fill.

##### 1.02 RELATED SECTIONS

- ###### A.
- This section is part of the Contract Documents and all general conditions, supplementary conditions and other specification sections of the document shall apply equally to this section.

##### 1.03 REFERENCES

- ###### A.
- ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- ###### B.
- ANSI/ASTM D698 - Test Methods for Moisture - Density Relations of Soils and soil - Aggregate Mixtures, Using 5.5 lb. (2.49 kg) Hammer and 12-inch (304.8 mm) Drop.
- ###### C.
- ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.



- D. ANSI/ASTM D1557 - Test Methods for Mixture - Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 kg) Hammer and 18 inch (457 mm) Drop.
- E. ASTM D2992 - Test Method for Density of Soil and Soil aggregate In-Place by Nuclear Methods (Shallow Depth).

#### 1.04 MEASUREMENT AND PAYMENT

- A. No specific payment shall be made under this section. Payment shall be lump sum or unit price as part of the various Alternates and in accordance with the bid form and Section 01025.

#### 1.05 SUBMITTALS

- A. Provide samples as requested by the Engineer for materials to be utilized in the work such as borrowed soils, gravel, sand and stone.
- B. Prior to starting work, submit performance data for the compacting equipment to be utilized. The maximum depth of material lifts shall be determined by the Engineer and may be verified by field compaction testing. Sufficient leveling and compacting equipment shall be provided to do the work of spreading and compacting the material promptly after it has been deposited. When, in the Engineer's judgement, such equipment is inadequate to spread and compact the material properly, the Contractor shall reduce the rate of excavation and placing of the fill or employ additional equipment.
- C. Provide numbers and types of equipment which will be used.

#### 1.06 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section.
- B. Use equipment of adequate size, capacity and quantity to accomplish the work of this Section in a timely manner.
- C. Comply with the directions of the Engineer and the requirements of governmental agencies having jurisdiction.

**PART 2 PRODUCTS****2.01 SOIL MATERIALS**

- A. Fill material is subject to the approval of the Engineer and may be that material removed from excavations or brought in from off the site. All material, whether from the excavations or from off-site, shall be of such nature that after it has been placed and properly compacted, it will make a dense, stable fill. It shall not contain vegetation, masses of roots, individual roots more than 18" long, or more than 1/2" in diameter, stones over 6" in diameter, or porous matter. Organic matter shall not exceed minor quantities and shall be well distributed.

**PART 3 EXECUTION****3.01 PREPARATION**

- A. Care and Restoration of Property
  - 1. The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end of the construction period.
  - 2. All surfaces that have been damaged by the Contractor's operations shall be restored to a condition at least equal to that in which they were found immediately before work was begun. Suitable materials and methods shall be used for such restoration.
- B. Vertical and Horizontal Control
  - 1. The Owner shall provide a benchmark from which all measurements shall be made. The Contractor shall be responsible for all other surveying as necessary for locating the principal parts of the work. The Contractor shall lay out the Work, locating and identifying the necessary points for construction as may be required. The Contractor shall provide all protective stakes, batterboards and temporary structures required to protect the construction layout points.

**3.02 INSTALLATION**

- A. Structure Excavation
  - 1. Excavation shall be true to the lines and grades shown on the plans. The final six inches shall be done with a grading bucket with a flat "no-teeth" leading edge. Final grading shall be done in such a manner as not to disturb the on-grade material. The

Contractor will be required to recompact the graded surface prior to proceeding with the work.

2. If satisfactory material is not found at the lines and grades required on the Plans, the Contractor shall, when directed by the Engineer, excavate and dispose of such material.

**B. Structure and Foundation Backfilling and Compaction**

1. Unless otherwise indicated on the drawings, material used for backfilling around and under structures shall be suitable material removed during excavation. The Engineer may require the stockpiling, drying, blending, and reuse of materials from sources on the project. Clay, silt, rock and uncompactable soils will not be considered suitable.
2. Structure backfilling and compaction methods shall obtain 95 % of maximum density at optimum moisture content as determined in accordance with ASTM Standards D698-70 or D1557-70 and amendments thereto. Results will be considered final. The compacted backfill shall extend beyond the extremities of walls or fittings under which it is to be placed a minimum of four feet in every direction.
3. The moisture content of the backfill shall be maintained within  $\pm 3\%$  of the optimum moisture content.
4. Backfill shall not be placed against or in structures until they have attained sufficient strength to support the loads to which they will be subjected. This determination may be dependent upon receipt and evaluation of compressive cylinder test results.
5. Backfill shall be placed in 12" layers and compacted over the full width unless otherwise directed in writing by the Engineer. Failures, ruptures and settlements resulting from poor compaction and soil placement techniques shall be the full responsibility of the Contractor. Any corrective work shall be performed at no additional cost to the Owner.

**C. Embankments and Non Structural Fill**

1. Fill material shall be material removed during excavation or material that meets the requirements of Section 2.01.
2. Frozen material shall not be placed on embankments nor shall embankment be placed on material frozen to a depth of over 3". If during the construction of an embankment, the top layer become

frozen to a depth of over 3", the frozen material shall be removed before a succeeding layer is placed on the embankment. This work shall be performed at no additional expense to the Owner.

Frozen excavated material which, when dry, can be used as embankment material, shall be allowed to thaw and dry and then be placed in the embankment. No compensation will be allowed for the storing and rehandling of these materials.

4. Embankments shall be formed by placing successive 12" layers of material uniformly distributed and compacted over the full width of the cross section utilizing approved compaction equipment.

**END OF SECTION**

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**SECTION 02226**

**BORROW MATERIAL**

**PART 1 GENERAL**

**1.01 SUMMARY OF WORK**

- A. Furnish all labor, materials, equipment and incidentals required to excavate, haul, place, and compact borrow material on all slopes which will be regraded; in the area around the building; areas shown on the plans or as determined in the field during construction.

**1.02 RELATED SECTIONS**

- A. Documents affecting the work of this Section include but are not necessarily limited to the General Conditions, Supplementary Conditions, and all Sections in Division 1.
- B. Section 01025 - Measurement and Payment
- C. Section 02060 - Demolition
- D. Section 02080 - Hazardous Materials Abatement.
- E. Section 02220 - Site Cleanup, Excavating, Backfilling and Compacting.
- F. Section 02920 - Topsoil
- G. Section 02936 - Seeding

**1.03 MEASUREMENT AND PAYMENT**

- A. Payment shall be unit price in accordance with Alternate 23 on the bid form and as described in Section 01025.

**1.04 REFERENCES**

- A. ASTM D422 - Method of Gradation Analysis.
- B. ASTM D4318 - Test Method for the Atterberg Limits.
- C. ASTM D1557 - Test Method for the Modified Proctor Test.

**1.05 SUBMITTALS**

- A. Provide representative samples of borrow materials taken from the source. Tag, label, and package the samples as requested by the Engineer. Provide access to the borrow site for field evaluation and inspection.
- B. Prior to the start of work, the Contractor shall submit to the Engineer performance data for all compaction equipment to be utilized.

**1.06 QUALITY ASSURANCE**

- A. No borrow shall be placed prior to the approval of the Engineer.
- B. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section.
- C. Use equipment of adequate size, capacity, and quantity to accomplish the work of this Section in a timely manner.
- D. Comply with the directions of the Engineer and the requirements of governmental agencies having jurisdiction.

**1.07 PROJECT/SITE CONDITIONS**

- A. Existing Conditions
  - 1. Contractor is to be aware of any environmental requirements and restrictions and is to comply with strict adherence to them.
  - 2. During hauling operations, all public and private roadway surfaces shall be kept clean and any borrow or other dirt which may be brought upon the surface shall be removed promptly and thoroughly before it becomes compacted by traffic. If necessary, the wheels of all vehicles used for hauling shall be cleaned frequently and kept clean to avoid bringing any dirt upon the paved surfaces.
  - 3. All excavation, hauling and placement of borrow material on site shall be conducted in such a manner so as to insure that no infringement of these specifications shall be violated.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

#### **A. General Borrow**

1. Material used for this item shall be excavated and hauled by the Contractor from off-site.
2. Material consisting of frozen clods, ice, and snow shall be rejected.
3. All borrow material to be used shall be subject to approval by the Engineer and the Engineer reserves the right to reject any borrow material from the job which does not meet the above requirements.

### **2.02 EQUIPMENT**

#### **A. Spreading**

1. Use equipment capable of adequately placing, spreading, and compacting materials to the depth specified.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- #### **A.**
- The Contractor shall ensure that all materials are properly stockpiled on site to prevent contamination by other soil materials.

### **3.02 INSTALLATION**

#### **A. Placement**

1. Borrow material shall be placed over the entire area in uniform lifts and compacted in accordance with standard procedures. All compaction shall be subject to inspection and monitoring by the Engineer.

### **3.03 FIELD QUALITY CONTROL**

- #### **A.**
- Maintain and repair all eroded areas during the life of this contract at no additional cost. Contractor may be required to berm areas around stock piles to prevent siltation runoff.

**END OF SECTION**

**SECTION 02830****FENCE AND BUILDING SECURITY****PART 1 GENERAL****1.01 SUMMARY**

- A. Section includes all labor, materials, equipment, transportation, and incidentals required to repair the existing fence with complete 8 foot high fence and to secure all openings on the overall building as shown on the site plan. This item will be bid as Alternate 13.

**1.02 REFERENCES**

- A. ASTM A121 - Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
- B. ASTM A153 - Specification for Zinc-Coated (Hot Dip) for Iron & Steel Hardware.
- C. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain Link Fence Fabric.
- D. ASTM F567 - Standard Practice for Installation of Chain Link Fences.
- E. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped, Zinc-Coated (Galvanized), Welded for Fence Structures.
- F. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.

**1.03 MEASUREMENT AND PAYMENT**

- A. Payment shall be unit price in accordance with the bid form and Section 01025 and will be considered Alternate 22.

**1.04 SUBMITTALS**

- A. Submit to Engineer, drawings and samples showing details of fabrication, erection, connections, hardware, and adjoining system interfaces for all equipment furnished under this Section.

**1.05 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with



the specified requirements and the methods needed for proper performance of the work of this Section.

## 1.06 RELATED SECTIONS

- A. This section is part of the contract documents and all general conditions, supplementary conditions and other specification sections of this document shall apply equally to this section.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. General - Used materials may not be employed for fencing. All material furnished shall be new and first quality and shall not have been painted. All steel shall be copper bearing, containing not less than 0.2% pure copper. Materials are to be galvanized as follows:
1. Pipe: 1.8 oz., complying with ASTM F1083.
  2. Hardware and Accessories: Comply with Table I of ASTM A153.
  3. Fabric: 2.0 oz., Class II of ASTM A392.
- B. Fabric - Provide 2" mesh woven from No. 9 standard gauge copper bearing steel wire per ASTM A392. Top and bottom salvages shall be twisted and barbed. The width of woven fabric shall be 8'. Fabric ties shall be No. 9 gauge aluminum wire spaced 12" on center on line posts and 24" on center on rails and braces.
- C. Posts, Rails and Fittings - Posts and rails shall conform to the following minimum requirements.

<u>Application</u>	<u>Nominal Pipe Size</u>	<u>O.D., Inches</u>	<u>Weight #/LF</u>
Top & Bottom Rails	1 1/4	1 5/8	2.2
Line Posts	2	2 3/8	3.6
2 7/8" Corner & Terminal Posts	2 1/2	2 7/8	5.7
Gate Posts (Pedestrian)	3 1/2	4	9.1
Gate Posts (Roadway)	8	8 5/8	28.6
Post Braces	1 1/4	1 5/8	2.2

Line posts shall have a maximum center to center spacing of 10'-0".

Provide wrought or malleable iron post caps, hardware and fittings.

Provide post braces at end and gate posts, and at both sides of corner and pull posts with the horizontal brace located at the midpoint of the fabric.

- D. Stretcher Bars and Bands - Bars shall be one piece equal to the full 8.0 foot height of the fabric with a cross section of  $\frac{3}{4}$ " x  $\frac{3}{16}$ ". Provide stretcher bars for each gate, end, pull, and two for corner posts. Bands shall be wrought or malleable iron spaced 15" on center.
- E. Concrete: Provide 3500 psi concrete.
- F. Plywood:  $\frac{3}{8}$ " exterior, CDX plyscore.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Excavation and Concrete Placement - All post holes shall have a plan dimension of 12" and a minimum depth of 42". Holes shall be clean and free of soil and debris. Concrete shall be placed continuously in one operation and tamped or vibrated for consolidation. Tops of post footings shall be crowned for drainage away from the post. Posts are to be vertically plumbed and held in position during placement and finishing. All posts shall be set into the concrete a minimum of 3'-0".
- B. Rails, Bracing, and Fabric - Concrete shall attain 75% of the 28 day strength before rails, tension wires and/or fabric is installed. A minimum of 3 days shall pass before installation of the above items.  
  
Fabric shall not be stretched and tensioned or gates hung until the concrete attains full strength. Fabric shall be installed with two inches clear space to finish grade.
- C. All corner and terminal posts are to be braced horizontally and diagonally. The braces are to extend over one adjacent panel.
- D. Miscellaneous - Install nuts for tension bands and hardware bolts on the side of the fence opposite the fabric. Repair galvanized coating where damaged using hot-applied repair compound applied in accordance with the manufacturers recommendations.
- E. Install plywood over all existing openings in the remaining building structure.

END OF SECTION

**SECTION 02920****TOPSOIL****PART 1 GENERAL****1.01 SCOPE OF WORK**

- A. Topsoil will only be required if soil removal takes place at the facility. Purchase, haul, deposit, spread, grade and compact topsoil to a depth of at least 4" over the entire disturbed surface of the site after other surface treatments have been applied to the limits as shown on the plans or specified herein, and elsewhere as directed by the Engineer. The contractor shall be responsible for supplying all topsoil on the site.
- B. The Contractor is also responsible to repair any areas outside the designated work areas that were damaged by the Contractor. Repairs will be made at no cost to the Owner.

**1.02 RELATED SECTIONS**

- A. This section is part of the contract documents and all general conditions, supplementary conditions and other specification sections of the document shall apply equally to this section.

**1.03 MEASUREMENTS AND PAYMENT**

- A. Payment shall be unit price in accordance with Alternate 24 on the bid form and as described in Section 01025.

**PART 2 PRODUCTS****2.01 MATERIALS**

- A. Topsoil
  - 1. All topsoil brought in from an off-site location shall, at a minimum, meet the following requirements.
  - 2. Loam shall consist of a fertile, friable, natural topsoil typical of the locality without admixture of subsoil, refuse or other foreign materials and shall be obtained from a well-drained arable site. It shall be such a mixture of sand, silt and clay particles as to exhibit sandy and clayey properties in and about equal proportions. It shall be free of stumps, roots, heavy or stiff clay, stones larger than 1 inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter.
  - 3. Prior to stripping, the loam shall have demonstrated, by the occurrence upon it of healthy crops, grass or other vegetative

growth, that it is well drained and that it does not contain toxic amounts of either acid or alkaline elements.

4. The loam shall contain not less than 5 percent nor more than 20 percent organic matter as determined by the loss-on-ignition of oven dried samples. Test samples shall be oven dried to a constant weight at a temperature of  $230^{\circ}\text{F} \pm 9^{\circ}$ . The loam shall have an acidity range of approximately 5.5 pH to 7.6 pH.

## **2.02 EQUIPMENT**

### **A. Earth Moving Equipment**

1. Adequate types and number of equipment shall be used to ensure that the topsoil is spread evenly and at the proper depth to all areas intended to be covered without damaging underlying soil layers or structures.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Top soil shall be deposited and spread to a 4" depth to the lines and grades shown on the plans or designated by the Engineer. All grass and weed growth on the areas designated to be loamed shall be cut to a maximum height of 2" before the loam is placed thereon. After the loam or topsoil has been spread, it shall be carefully prepared for seeding by spading or harrowing, and raking. All large, stiff clods, lumps, large stones, brush, roots, stumps, litter and other foreign material shall be removed from the topsoil and disposed of satisfactorily.
- B. The compaction shall be equivalent to that produced by a hand roller weighing from 75 to 100 pounds per foot of width. The compaction may be obtained by rolling, dragging or any method that produces satisfactory results. All depressions caused by settlement or rolling shall be filled with additional materials and the surfaces shall be regraded and rolled until it presents a reasonably smooth and even finish and is up to the required grade.
- C. During hauling operations, all public and private roadway surfaces shall be kept clean and any loam or other dirt which may be deposited upon the surface shall be removed promptly and thoroughly before it becomes compacted by traffic. If necessary, the wheels of all vehicles used for hauling shall be cleaned frequently and kept clean to avoid depositing any dirt upon the surface.
- D. The ground surface shall be fine graded, raked and rolled so as to prepare the surface of the topsoil for hydroseeding.

### 3.03 FIELD QUALITY CONTROL

- A. The responsibility for satisfactory results on work carried out under this Item rests entirely on the Contractor regardless of the prior approval of the materials and methods on the part of the Engineer.

END OF SECTION

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**SECTION 02936**

**SEEDING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes all labor, equipment and materials required for new loam and seeded areas as determined by the Site Engineer and in disturbed areas. Seeding will be required only in the event new topsoil is brought to the site as a result of soil excavation activities.

**1.02 RELATED SECTIONS**

- A. This section is part of the contract documents and all general conditions, supplementary conditions and other specification sections of this document shall apply equally to this section.

**1.03 MEASUREMENT AND PAYMENT**

- A. Payment shall be unit price in accordance with Alternate 25 on the bid form and as described in Section 01025.

**1.04 SUBMITTALS**

- A. Submit manufacturer's certificates of compliance for each seed mixture proposed, stating botanical and common name, percentage by weight and percentage of purity, germination, and weed seed for each species.
- B. Submit samples of all materials for inspection and approval upon Engineer's request.

**1.05 JOB CONDITIONS**

- A. Do not spread seed when wind velocity exceeds 5 miles per hour.
- B. Do not plant when drought, excessive moisture, or other unsatisfactory conditions prevail.
- C. Seeding shall be performed during normal planting seasons.

## PART 2 PRODUCTS

### 2.01 MATERIALS

#### A. Topsoil

1. Stockpiled topsoil from on-site shall be used prior to off site material for topsoil.

#### B. Lime shall be ground limestone containing not less than 85 % calcium and magnesium carbonates and be ground to such fineness that at least 50 % shall pass a 100-mesh sieve and at least 90 % shall pass a 20-mesh sieve.

#### C. Fertilizer shall be commercial mixed free flowing granules or pelletized fertilizer, grade for lawn and naturalized areas. Fertilizer shall be delivered to the site in original unopened containers each showing the manufacturer's guaranteed analysis conforming to applicable state fertilizer laws. At least 40 % of the nitrogen in the fertilizer used shall be in slowly available (organic) form.

#### D. Seed

1. Seed shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Seed shall be furnished in sealed bags or containers bearing the date of the last germination, which date shall be within a period of 6 months prior to commencement of planting operations. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85 %, a percentage of germination not less than 90 %, shall have a weed content of not more than 1 % and contain no noxious weeds. The seed mixtures shall consist of seed proportioned by weight as follows:

##### a. Lawn Area Seed Mix

Pennlawn Creeping Red Fescue	20 %
Kentucky 31 Fescue	40 %
Palmer Perennial Ryegrass	15 %
Annual Ryegrass	25 %

2. The seed shall be furnished and delivered premixed in the proportions specified above. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

**E. Mulch**

1. Anti-erosion mulch shall be clean, seed-free hay or straw.
2. Wood cellulose fiber mulch for hydroseeding shall be a specially processed cellulose fiber containing no growth or germination-inhibiting factors. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground, the material shall allow absorption and percolation of moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content and not contain in excess of 10% moisture.
3. Mulch shall be at least 2" thick on steep slopes or areas which could easily erode.

**PART 3 EXECUTION****3.01 APPLICATION****A. For all areas to be seeded:**

1. Lime shall be applied at the rate of fifty pounds per 1,000 square feet or as determined by the soil analysis.
2. Fertilizer (10-20-10) shall be applied at the rate of thirty pounds per 1,000 square feet or as determined by the soil analysis.
3. Seed shall be sown at a rate recommended by the manufacturer.
4. Fiber mulch shall be applied at the rate of forty pounds per 1,000 square feet except in areas to be covered with erosion control blankets which shall receive a rate of 20 pounds per 1,000 square feet.

**B. After the topsoil is placed and before it is raked to true lines and rolled, limestone shall be spread evenly over the loam surface and thoroughly incorporated by heavy raking to at least one half the depth of topsoil.****C. The application of fertilizer may be performed hydraulically in one operation with hydroseeding and fiber mulching. The Contractor is responsible for cleaning all structures and paved areas of unwanted deposits of the hydroseeded mixture.**



**3.02 INSTALLATION**

- A. Previously established grades shall be maintained in a true and even condition.
- B. Surface is to be leveled and restored to level with existing grade.
- C. In carrying out his excavation, the Contractor shall salvage all existing sod and loam. This salvage material shall be machine-excavated and laid to one side.
- D. Subgrade shall be prepared by tilling prior to placement of topsoil to obtain a more satisfactory bond between the two layers. Tillage operations shall be across the slope. Tillage shall not take place on slopes steeper than 2 horizontal to 1 vertical or where tillage equipment cannot be operated. Tillage shall be accomplished by disking or harrowing to a depth of 9" parallel to contours. Tillage shall not be performed when the subgrade is frozen, excessively wet, extremely dry or in other conditions which would not permit tillage. The subgrade shall be raked and all rubbish, sticks, roots and stones larger than 2" shall be removed. Subgrade surfaces shall be raked or otherwise loosened immediately prior to being covered with loam. Subgrade shall be inspected and approved by the Owner's Project Representative before topsoil is placed.
- E. Topsoil shall be placed over approved areas to a depth sufficiently greater than required so that after natural settlement and light rolling, the complete work will conform to the lines, grades and elevations indicated.
- F. After topsoil has been spread, it shall be carefully prepared by scarifying or harrowing the hand raking. All stiff clods, lumps, roots, litter and other foreign material shall be removed from the loamed area and disposed of by the Contractor. The areas shall also be free of smaller stones, in excessive quantities, as determined by the Owner's Project Representative. The whole surface shall then be rolled with a hand roller weighing not more than 100 pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional loam and the surface shall be regraded and rolled until a smooth and even finished grade is created.
- G. Seeding, mulching and conditioning shall only be performed during those periods within the seasons which are normal for such work as determined by the weather and locally accepted practice, as approved by the Engineer. The Contractor shall hydroseed only on a calm day.
- H. Seeding shall be done within ten days following soil preparation. Seed for slopes shall be applied hydraulically at the rates and percentages indicated. The spraying equipment and mixture shall be so designed that when the

mixture is sprayed over an area, the grass seed and mulch shall be equal in quantity to the specified rates. Prior to the start of work, the Contractor shall furnish the Engineer with a certified statement as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the Contractor's hydroseeder. Upon completion of seeding operations, the Contractor shall furnish the Engineer with a certified statement on the actual quantity of solution applied.

- I. The surface shall be seeded using a spreader or seeding machine. Seed shall be distributed evenly over the entire area by sowing an equal quantity in two directions at right angles to each other. Cultipacker or approved similar equipment, may be used to cover the seed and to firm the seedbed. In areas inaccessible to a cultipacker, seed shall be raked lightly into top 1/8" of soil and rolled in two directions with a water ballast roller. Seeded areas shall be protected against erosion by spreading a continuous blanket of anti-erosion mulch not less than 1 1/2" loose measurement over seeded areas after completion of seeding.
- J. On slopes, the Contractor shall provide against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until a good sod is established.

### 3.03 MAINTENANCE AND PROVISIONAL ACCEPTANCE

- A. The responsibility for satisfactory results on work carried out under this Section rests entirely on the Contractor regardless of the prior approval of the materials and methods on the part of the Engineer.
- B. The Contractor shall reseed all seeded areas if and when necessary until a good, healthy, uniform growth is established over the entire area seeded, and shall maintain all seeded areas in an approved condition until acceptance. Suitable signs and barricades shall be placed to protect the seeded areas.
- C. The Engineer will inspect all work for provisional acceptance at the end of a ten week maintenance period, upon the written request of the Contractor received at least ten days before the anticipated date of inspection.
- D. After the grass has started, all areas and parts of areas which fail to show a uniform stand of grass for any reason whatsoever, shall be seeded repeatedly until all areas are covered with a satisfactory growth of grass.
- E. After the inspection has occurred but prior to provisional acceptance, a soil test shall be performed to determine if additional soil fertilization

should occur. If necessary, additional fertilizer not to exceed 30 lbs. per 1000 sq. ft. of 20-10-10 shall be applied as directed by the Engineer.

- F. The Contractor shall furnish full and complete written instructions for maintenance of the seeded areas to the Owner prior to provisional acceptance.
- G. The inspection by the Engineer will determine whether maintenance shall continue in any area or manner. Maintenance shall include all regrading, refertilizing, and reseeding which may be necessary in the opinion of the Engineer.
- H. After all necessary corrective work and clean up has been completed, maintenance instructions have been received by the Owner, and the Owner has provisionally accepted the lawn areas, the Contractor's responsibility for maintenance of lawns, or parts of lawns shall cease.

#### 3.04 GUARANTEE PERIOD AND FINAL ACCEPTANCE

- A. All seeded areas shall be guaranteed by the Contractor for not less than one full year from the time of provisional acceptance.
- B. Seeded areas not demonstrating satisfactory stands as determined by the Engineer, shall be renovated, reseeded, and maintained meeting all requirements as specified herein.

END OF SECTION

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WORK PLAN

APPENDIX A

**WORK PLAN  
PHASE II**

**LAKE SALVAGE  
2527-29 West Lake Street  
Chicago, Illinois**

**Prepared for:**

**Litton Systems, Inc.  
Arlington, Virginia**

**Prepared by:**

**Thomas C. Couture, P.E.  
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**November 1994  
Revised December 1994**

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## 1.0 Introduction

Lake Salvage is an abandoned scrap metal yard and wire reclamation facility, which reportedly began its operations in the 1950's. The operations consisted of the purchase, separation, and resale of various grades of scrap metal. The Illinois Environmental Protection Agency (IEPA) granted Lake Salvage an operating permit for a RCF 8001 incinerator on August 11, 1976. The incinerator was used to burn the insulation on cables and wires for the recovery of copper-bearing scrap. The incinerator operated until September of 1986 when Lake Salvage closed. At that time the incinerator was partially dismantled.

The Lake Salvage Site is located in a mixed residential and industrial area of Chicago, Illinois. Lake Street forms the Site's northern border. A Chicago Transit Authority elevated train runs east-west above Lake Street. An auto salvage yard is located to the east of the Site; another is located to the west. An alley, a two-story apartment complex, and a vacant lot are located south of the Site.

The Site is surrounded by a wooden fence, however, the fence is in disrepair. The topography of the Site is flat, and the Site is concrete covered. There is one building on-site in the north-central area. It appears to have been used as an office. The building acts as the divider between the east and west portions of the Site. The west portion of the Site is partially roofed. The east portion of the Site contains a loading dock.

On April 15, 1987, IEPA collected ash samples from the Site as part of an IEPA-commissioned incinerator study and the analytical results of the samples indicated that elevated levels of 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD) and its isomers were present at the Site. In July 1987, IEPA officially withdrew Lake Salvage Company's operating permit for the incinerator.

On July 11, 1990, U.S. EPA's Field Investigation Team (FIT) conducted a preliminary assessment at the Site. The wooden fence was in disrepair. The west courtyard contained an uncovered tank and approximately 20 empty drums. The east court yard

contained scrap wood, scattered debris and approximately 70 uncovered drums. Some of these drums were filled with what appeared to be incinerator ash. Scattered drums including lumber were observed in both courtyards. A small concrete-covered trench was located immediately west of the scrap wood pile. FIT observed soil and incinerator ash in the trench. Two inoperable incinerators were located approximately 50 feet east of the western site boundary, and five feet north of the southern boundary.

Seven soil samples were collected. The samples were analyzed for (among other things) the U.S. EPA Target Compound List (TCL), the target Analyte List (TAL) analytes, Polychlorinated biphenyls (PCBs), and dioxins. PCBs, dioxins and other constituents were detected in on-site surface soil samples, including Aroclor 1248 at 4,400 parts per billion (ppb), Aroclor 1254 at 5,200 ppb, cobalt at 150 parts per million (ppm), and 2,3,4,8-TCCD at 158.5 parts per trillion (ppt). It was also observed that incinerator ash was present on-site in uncovered drums.

In March 1994, the EPA's On-Scene Coordinator (OSC) and Technical Assistance Team (TAT) conducted a site assessment. The site was partially fenced and in disrepair. Site access was not completely restricted in several areas of the site. Evidence of trespassing including vandalism, graffiti, bottles, rubbish and tires were found throughout the site. All of the drums previously noted were found uncovered in the east storage yard. Many of the drums were tipped over and ash was scattered throughout the east storage yard. Two inoperable incinerators were found to be in very poor condition. A car seat was found inside the open west incinerator. The on-site cinder block building was in poor condition and displayed failing walls. Several partially burned capacitors were found scattered throughout the east storage yard and mixed with the drummed ash.

Ash samples were obtained from the west incinerator, one of the drums, and an ash pile located within the building. A sample of fire brick was obtained from both incinerators. Wipe samples were obtained from the inside and outside of the cinder block building near the incinerators. Preliminary results confirmed elevated levels of dioxin and furans in the ash.



On April 19, 1994 the EPA mobilized to the site to perform an emergency removal action. By April 23, 1994, the EPA had consolidated ash from the east storage yard and from the open west incinerator and bulk bagged the ash into a roll-off box. The fence and building access points were reinforced.

Pursuant to the conditions of the Administrative Order dated September 29, 1994, Litton Systems, Inc. assumed responsibility for the disposal of the accumulated ash material. On October 13, 1994 the ash was transferred to a lined bulk trailer and trucked by Capitol Transport of Calumet City, Illinois to the Envirosafe facility in Boise, Idaho for disposal.

**1.1 Assessment of Structural Integrity** - The structural integrity of the buildings located at the site was reviewed by Messrs. Tom Couture, P.E., and Zen Kruckowski, P.E. of Tighe & Bond, Inc. The condition of the buildings is extremely deteriorated as exhibited by sections of collapsing roof and walls and evidence of fire damage to the roof structure. The condition of the two former incinerators shows evidence of severe deterioration as evidenced by the crumbling brick, gaping openings in the brick walls and general disrepair.

In summary, it is the opinion of the above named inspectors, that the condition of the incinerator structures is beyond cost effective repair and warrants immediate demolition as threat to public safety. However, further investigation of the building structures and site sampling will be required to evaluate the most cost effective approach to site decontamination.

**1.2 Extent of Contamination** - The limited analytical data indicates the presence of dioxins, polychlorinated biphenyls (PCBs) and lead. These contaminants are apparently present as constituents in the ash material. A walkthrough inspection of the site by Zen Kruckowski of Tighe & Bond on October 13, 1994, revealed that apparently a thin layer of the ash is present within the existing structure and appears to be mixed in with the debris and litter.

In addition, a storm drain is located at the former shipping/receiving dock which may have conveyed the ash material into the municipal storm drain system.

The initial sampling program is designed to help in evaluating the level and extent of building and site contamination. The analytical results will be reviewed and a site specific recommendation will be formulated as to the most appropriate approach to site decontamination.

## **2.0 PERFORMANCE STANDARD**

In accordance with the Illinois Hazardous Waste Management Regulations (IHWMR), the facility shall be closed in a manner that:

- Ensures that the hazardous waste management unit will require no further maintenance or controls;
- Eliminates threats to human health and the environment;
- Avoids escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, and waste decontamination products to the soil, surface or groundwater, or atmosphere; and
- Assures that the facility closure is in compliance with all applicable Federal, State and Local regulations.

The purpose of this work plan is to document the closure procedures which will ensure compliance with this performance standard. The actual demolition procedures and cleanup standards are discussed in the following section.

### **3.0 SAMPLING PROCEDURES/DEMOLITION**

The following procedures will be employed in the initial sampling and subsequent demolition of incinerators, buildings and decontamination of the immediate surrounding areas. All sampling shall be performed in accordance with Appendix C. A more detailed project schedule is located in Section 8 of this Work Plan.

The work shall be subdivided into six distinct tasks as follows:

- Task A - Initial site sampling.**
- Task B - Demolition and stockpiling of incinerator structures.**
- Task C - Stockpiling of contaminated site debris and litter.**
- Task D - Demolition and disposal of building structures (as required).**
- Task E - Characterization and disposal of stockpiled wastes.**
- Task F - Decontamination and confirmatory sampling program.**

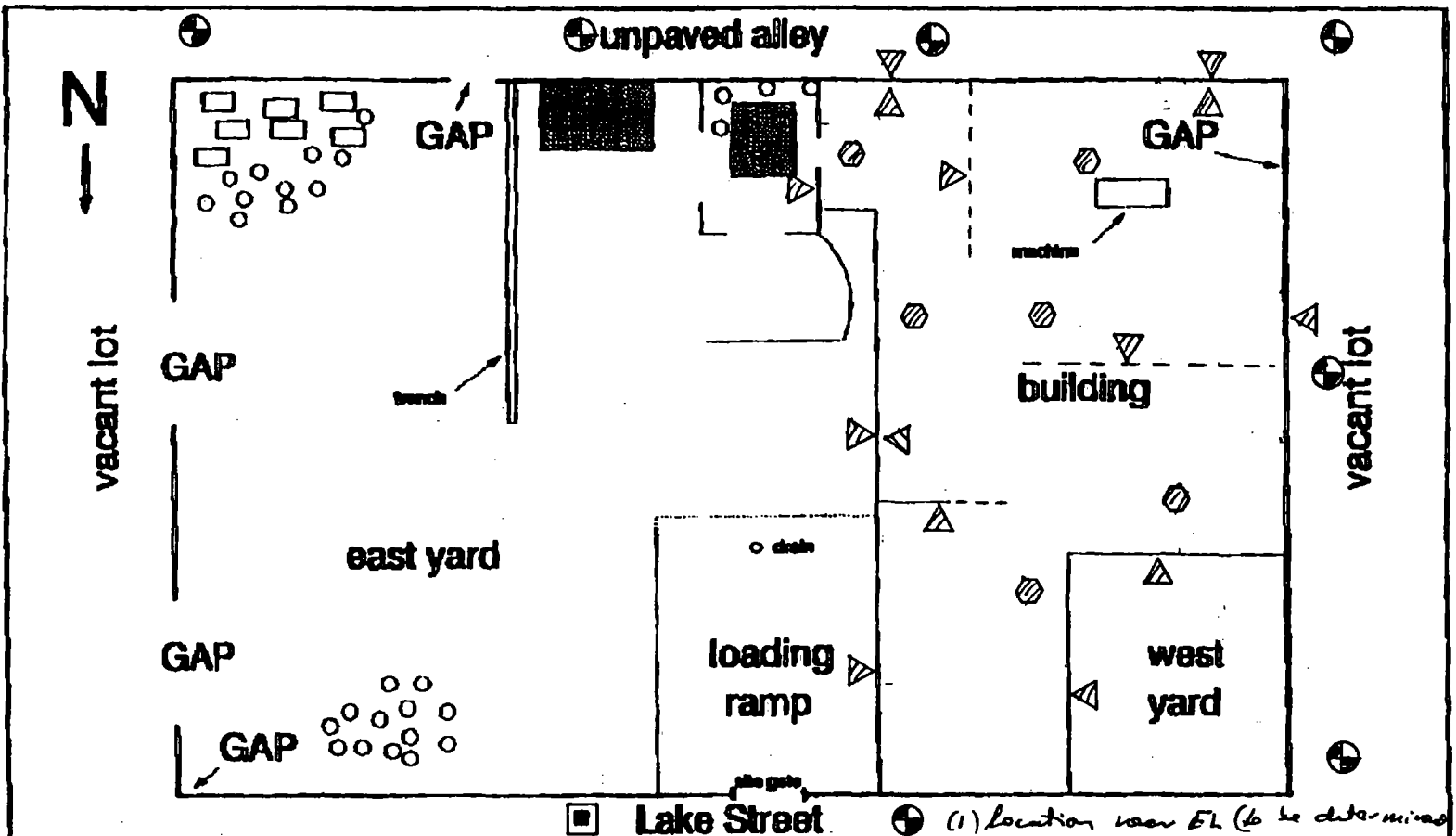
**3.1 Initial Site Sampling** - An initial site sampling round will take place on or about December 14, 1994 to characterize the extent and level of contamination of the building structures and existing litter. This information will be used to determine the most appropriate method of decontamination (i.e., power wash, vacuum cleanup, encapsulation, etc.) or demolition and landfill disposal of the building debris. The wipe sample protocol outlined in Appendix C will be observed. It is estimated that approximately twenty wipe samples of the building walls and litter will be taken and analyzed for lead, PCBs and dioxins. As part of the initial sampling round, Tighe & Bond and USEPA representatives will identify appropriate background and off-site sampling locations. If possible, off-site wipe samples and/or soil samples will be taken and analyzed for lead, dioxins and PCBs. This effort will include four (4) wipe samples on West Lake Street and up to thirty-six (36) soil samples in the adjacent vacant lot and alleyway, nine (9) of which will include dioxin samples. A soil background sample will also be taken in a yet-to-be-determined location along West Lake Street. The proposed location of on-site wipe samples and off-site soil samples near the site are summarized in Table 1 and identified on the Site Plan located on the following page. Wipe samples of the incinerator structures will not

be taken since the structures will be town down and disposed of to a TSDF. This information will be used during the later stages of the project to confirm an appropriate clean-up threshold for the site for the three contaminants.

**TABLE 1**  
**Initial & Background Sampling**

Item No.	Location	Parameters	No. of Samples	Media	Type
1	Site	Lead	6	Litter	Wipe
		Dioxins	6	Litter	Wipe
		PCBs	6	Litter	Wipe
2	Site	Lead	14	Bldg. Walls	Wipe
		Dioxins	14	Bldg. Walls	Wipe
		PCBs	14	Bldg. Walls	Wipe
3	Alleyway/Vacant Lot	Lead	36	Walking Surface	Wipe/Soil
		Dioxins	9	Walking Surface	Wipe/Soil
		PCBs	36	Walking Surface	Wipe/Soil
4	West Lake Street <sup>(6)</sup>	Lead	4	Walking Surface	Wipe
		Dioxins	4	Walking Surface	Wipe
		PCBs	4	Walking Surface	Wipe
5	Near W. Lake St. <sup>(2)</sup>	Lead	1	Walking Surface	Soil
		Dioxins	1	Walking Surface	Soil
		PCBs	1	Walking Surface	Soil

Note: (1) Sample location to be determined by jointly by Tighe & Bond and USEPA.



**LEGEND**

- major drum area
- tanks
- incinerator
- site boundary
- building wall

ecology and environment, Inc.  
Technical Assistance Team  
Region V

TITLE <b>SITE FEATURES</b>	FIGURE # <b>2</b>
NOTE <b>LAKE SALVAGE CO.</b>	SCALE <b>N/A</b>
CITY <b>CHICAGO</b>	STATE <b>IL</b>
PAN <b>E10873SAA</b>	

- PROPOSED SAMPLE LOCATIONS**
- SURFICIAL SOIL SAMPLE (lead, PCBs, dioxins) (36) (36) (9)
  - wipe sample - (lead, PCBs, dioxins)
  - wipe sample - litter (lead, PCBs, dioxins)
  - wipe sample - well (lead, PCBs, dioxins)

**3.2 Demolition and Disposal of Incinerator Structures** - Previous test results indicate that the incinerator structures are contaminated with excessive levels of dioxins and PCBs. Therefore, it is anticipated that resultant demolition debris shall be disposed of at a TSDF. The debris will be stockpiled, tested and characterized for disposal purposes. The Contractor shall designate an area in the southeasterly corner of the property to stockpile the incinerator debris. The debris will be stockpiled on a 6 mil polyethylene liner, bermed and covered with a 6 mil polyethylene sheet.

The waste stockpile shall be sampled and analyzed in accordance with 35 IAC 721 to determine its hazardous waste characteristics and disposed of to RCRA permitted TSDF as outlined in Section 4.

**3.3 Removal and Disposal of Site Debris** - A walkthrough inspection of the site indicates that the debris and litter found at the site may be covered with a layer of ash dust. Consequently, the debris may pose significant health risks.

**As part of the initial site sampling program, wipe samples will be taken to determine the extent (if any) of lead, PCBs and dioxins contamination of the litter.**

**If necessary, during the building clean-up/demolition phase of the work, all removal work will be preceded by covering the debris interior floor areas with a layer of wetted pulp approximately ¼ inches thick to preclude potential air borne contamination with ash particulates. The hydro pulp equipment will remain active throughout the debris removal and stockpiling process to wet down the materials, as appropriate.**

**The Contractor shall designate an area in the northeasterly corner of the property which will be used to stockpile the debris, prior to sampling and disposal.**

**The Contractor will then proceed to remove the debris using a small excavator such as a Bobcat to remove the debris and stockpile it at the designated area. The debris will be stockpiled on a 6 mil polyethylene liner, bermed and covered with a 6 mil polyethylene sheet. It is estimated that approximately 25 cubic yards of the debris will be stockpiled.**

The Contractor shall sample the waste stockpile in accordance with 35 IAC Subpart D to determine whether the waste can be classified as a special waste under the Illinois Waste Management Rules (IWMR).

In the event the analytical results indicate the presence of any of the contaminants in excess of acceptable concentrations for disposal as special waste under the IWMR, the waste stockpile shall be disposed of to a TSDF in accordance with waste removal procedures outlined in Section 4.

**3.4 Demolition and Disposal of Building Structures** - Prior to any demolition work, the Contractor shall contact all utilities and arrange to have all power, gas and water connections terminated. Next, the Contractor shall designate an area in the northwesterly corner of the site which will be used to stockpile the building demolition debris. The location from which each sample was taken shall be clearly marked for future reference in the event future segregation is required. The analytical results shall determine whether the stockpile can be disposed of to the landfill as special waste or to a TSDF as outlined in Table 1.

In the event analytical results indicate the presence of any of the contaminants in excess of acceptable concentrations for disposal as special waste under the IWMR, the debris stockpile shall be disposed of to a TSDF in accordance with waste removal procedures outlined in Section 4.

The waste stockpile shall be sampled and analyzed in accordance with 35 IAC 721 to determine its hazardous waste characteristics and disposed of to RCRA permitted TSDF as outlined in Section 4.

**3.5 Storm Drain Sampling** - The Contractor shall obtain a sediment sample from the storm drain catch basin and the effluent storm pipe. In addition, the Contractor shall identify an upstream and downstream storm manholes located on West Lake Street. A sediment sample from each manhole shall be obtained. All samples shall be analyzed for

lead, PCBs and dioxins. The results of the sampling shall be evaluated to determine if the storm drain catch basin and associate storm drain pipe will require decontamination.

#### **4.0 WASTE MATERIAL REMOVAL**

Within 90 days after receipt of the final volume of hazardous waste, all solid and hazardous waste will be identified, labeled, manifested, and transported in accordance with 35 IAC Parts 722, 723, 724 and 725 to a permitted special waste landfill or an off-site RCRA permitted treatment, storage, and disposal facility, as appropriate. The maximum hazardous waste which will be generated as a result of the demolition work is unknown at this time. During the cleaning and decontamination process, the following wastes will be accumulated:

- Wash waters containing PCBs, dioxins and D008 waste accumulated during the washing of the concrete surface by the Contractor; and
- Personal protective equipment and plastic used during the project by the Contractor.

A hazardous waste determination shall be made on all waste as required by 35 IAC 721. If the waste fails the characteristics of hazardous waste, then, it must be managed as hazardous waste in full accordance with the 35 IAC 721 and 728 and transported off-site within 90 days to be managed at a RCRA authorized permitted treatment, storage, and disposal facility. If deemed non-hazardous waste and analytical results indicate compliance with other applicable regulations (i.e. local wastewater and solid waste regulations), then the waste can be disposed of accordingly (i.e. landfill or Publicly Owned Treatment Works (POTW) via tanker). For wastes which are transported to and discharged into the POTW treatment system or to the on-site evaporation tanks, advance approval or a permit will have to be provided by the POTW or IEPA.



## **5.0 SITE DECONTAMINATION**

The Contractor shall secure the existing storm catchbasin by plugging the outlet pipe with an inflatable plug. The storm drain structure shall serve as a collection point for any wastewater which may be generated in the next phase of the project. The Contractor shall fashion a flexible funnel which will be affixed to the inner lip of the manhole opening. A 2' x 6' mil polyethylene liner shall be formed into a tube approximately 2 feet in diameter. The tube shall be affixed to the inner lip of the manhole opening using twisted wire. Next, the Contractor shall place a 10 gallon polyethylene container into the manhole and fold the flexible funnel into the 10 gallon container.

Following the demolition work and off-site disposal of the various wastes as identified in Section 3, the Contractor shall proceed with decontamination of the remaining building walls and concrete surfaces found at the Site. The Contractor shall hand-scrape any remaining debris materials and place them in bulk drums for off-site disposal.

The contractor shall use a previously selected and appropriate clean-up method such as power washing, vacuuming or encapsulation of the various site surfaces. All wastewaters will be directed into the manhole collection tank. All surface areas designated for cleaning will be rinsed and a final cleaning will be performed using trisodium phosphate solution. The Contractor shall minimize the use of water during the power washing and rinsing operation. The collected washwater will be pumped into steel drums using a submersible pump. The wastewater will be characterized for disposal purposes and disposed of in accordance with applicable regulations as identified in Section 4.

The Contractor will be required to provide a "clean debris surface" at the completion of the concrete cleaning. Clean debris surface means the surface, when viewed without magnification, will be free of all visible hazardous waste except that residual staining from waste consisting of light shadows, slight streaks or minor discolorations, and soil and wastes in cracks, crevices and pits shall be limited to no more than 5% of each square inch of surface area. The cleanup work shall generally meet the performance standards identified in the Federal Register August 18, 1992 Regulation 268.45 and as shown in Appendix D.

The clean surface criteria shall meet background levels (i.e. W. Lake Street) for PCBs, lead and dioxins or the following concentrations, whichever is greater:

**TABLE 2**  
**Recommended Clean-up Thresholds**

	Surface		Soil
	Without encapsulation	With encapsulation	
Lead (walking surface)	(1)	(1)	400 mg/kg
Lead (walls)	200 ug/cm <sup>2</sup>	2 mg/cm <sup>2</sup>	NA
PCBs	10 ug/cm <sup>2</sup>	100 ug/cm <sup>2</sup>	1 mg/kg
Dioxins	2.67 pg/cm <sup>2</sup>	26.7 pg/cm <sup>2</sup>	(to be determined)

**Note:** (1) Appropriate lead levels are currently under review by Tighe & Bond.

## **6.0 CONFIRMATORY SAMPLING PROGRAM**

Following the removal and disposal of all demolition debris and hazardous wastes, the Contractor shall implement a confirmatory sampling plan in accordance with CFR 300.415(k) to investigate the extent of off-site contamination which may be related to the Site. The sampling program shall consist of surficial soil samples and wipe samples as outlined in this section and in accordance with sampling protocol located in Appendix C. A total of 12 wipe samples shall be taken within the Site and another 36 surface soil samples and wipe samples shall be taken in the alleyway and the vacant lot adjacent to the Site. In addition, 4 random wipe samples shall be taken from West Lake Street during the initial stages of the decontamination effort as background samples. Table 1 provides a summary of the initial sampling program. Further sampling and analysis may be required following the evaluation of the initial data. If deemed necessary, Tighe &

Bond will provide specific recommendations for further sampling in the final report which will be submitted to the US EPA, Region V.

#### **6.1 Sampling Procedure -**

- a. Samples shall be collected from the Site, the alleyway, the vacant lot and West Lake Street. These samples shall be labeled, sent to an environmental laboratory, analyzed for hazardous waste parameters previously identified and summarized in Table 3.
- b. A minimum of 100 square centimeters will be wiped for each sample. The most appropriate means of collecting samples (scraping, coring, wiping or a combination) will be used.
- c. All sampling and analysis will be performed under the supervision of an engineer.
- d. The background and confirmatory results will be statistically compared for each parameter using the Cochran's Approximation as shown in Appendix E. If the parameter value of the background and confirmatory samples are determined to be statistically insignificant for each parameter, then the location is deemed "clean" and decontamination is completed. However, if the parameter value between the background and confirmatory samples are statistically significant, then the decontamination operation (i.e., rinsing concrete surfaces) must continue.

#### **7.0 FINAL REPORT**

Within 60 days after completion of all removal actions and review of all sampling data, Tighe & Bond shall submit to the USEPA a final report summarizing all actions taken to conform to the requirements of the administrative consent order. The final report shall conform to the requirements set forth in 40 CFR 300.165 and will also include a compliance cost summary, a discussion of quantities and types of waste removed and their destinations, a presentation of analytical results and all relevant information generated as a result of complying with the consent order.

Table 3

Confirmatory Sampling Matrix

<u>Item No.</u>	<u>Location</u>	<u>Parameters</u>	<u>No. of Samples</u>	<u>Type</u>
1.	Site	Lead	12	Wipe
		Dioxins	12	Wipe
		PCBs	12	Wipe
2.	Storm Drain System	Lead	3	Sediment
		Dioxins	3	Sediment
		PCBs	3	Sediment

Table 4

Parameter Test Methods

<u>Parameter</u>	<u>SW-846 Test Method</u>
TCLP/Hazardous	Various Methods
Hazardous Waste Characteristics Method	
Polychlorinated Biphenyls (PCBs)	8080
Dioxins	1613
Lead	6010
RCRA	
Corrosivity	9040
Reactive Cyanide	9010
Reactive Sulfide	9030
Ignitability	1010

Note: Test Methods for Evaluating Solid Waste, EA-SW846, Third Edition, 1986,

## **8.0 PROJECT SCHEDULE**

Upon receipt of the approved work plan, Litton Systems will implement this plan. The EPA and IEPA will be notified immediately if the work plan activities should require an extension of time.

The proposed project schedule reflects changes discussed with Fred Bartman of the EPA on December 7, 1994. A more detailed discussion of each proposed task follows.

### **TASK 1 Initial Sampling Round**

Wipe samples of the various building walls located at the site will take place on December 14, 1994. In addition, Fred Bartman (USEPA) and Zen Kruckowski (Tighe & Bond) will tour the immediate vicinity of the site to identify appropriate background sample locations. If possible, background soil and wipe samples will be taken on the same day as site wipe samples. As part of Task 1, Zen Kruckowski will obtain information as to existing building dimensions to determine potential debris volume resulting from future building demolition work.

Estimated timeframe: 5 business days

### **TASK 2 Prepare Bid Documents**

Starting immediately (12/9/94), Tighe & Bond will initiate the preparation of Bid Documents which will be used in soliciting competitive proposals for the work described in this work plan. The preparation of the Bid Documents will coincide with the waiting period for receiving analytical results generated during the initial sampling round (Task 1). The Bid Documents will be finalized upon receiving the analytical data generated under Task 1.

Estimated timeframe: 10 business days

**TASK 3 Analytical Results/Evaluation of Data**

The samples obtained during the initial sampling round will be analyzed by Commonwealth Analytical Laboratory. The results will be evaluated to determine which of the existing building structures will warrant demolition. The data will be used by Tighe & Bond to structure the project Bid alternates for demolition, cleaning and/or encapsulation of building work.

Estimated timeframe: 30 days

**TASK 4 Solicit Bids from Contractors**

The completed Bid Documents prepared under Task 2 will be forwarded to a select list of Contractors. It is Litton's corporate policy that a minimum of three competitive bids must be received for all major projects.

Estimated timeframe: 20 business days

**TASK 5 Evaluate Bids/Award Contract**

The proposal for the Lake Salvage work will be reviewed and the contract will be awarded to the most experienced and cost effective bidder. The review/award process will include review of bids, evaluation of bid item costs, contact with contractor references, interview with the selected Contractor and completion and preparation of all insurance and bond requirements.

Estimated timeframe: 10 business days

**TASK 6 Mobilization**

The selected Contractor is expected to mobilize on site within 10 days of receiving a Notice to Proceed.

Estimated timeframe: 10 business days

**TASK 7 Demolition/Clean-up**

The Contractor will adhere to the Work Plan and Bid Documents in carrying out the work. Initially, both incinerators will be demolished and the debris will be stockpiled at a designated area for further waste characterization and

disposal to a TSDF. Depending on the findings resulting from the initial sampling round, the existing litter and debris, and the existing building structures may require disposal to a TSDF. The litter and building structures identified for disposal to a TSDF will be stockpiled separately for further waste characterization and disposal. Additional building structures which may require demolition and disposal to a demolition debris landfill will be stockpiled separately and characterized for disposal. The remaining building structures which may require remediation will be either cleaned or encapsulated to meet threshold levels identified in the Work Plan.

Estimated timeframe: 10 business days

#### **TASK 8 Waste Characterization**

The stockpiled waste and debris will be sampled by the Contractor and characterized for disposal purposes. The timeframe includes laboratory time to perform the required analyses with typical turnaround time.

Estimated timeframe: 20 business days

#### **TASK 9 Dispose of Waste Materials**

Once the stockpiled waste materials are adequately characterized, Tighe & Bond will locate the most cost effective TSDF and/or demolition debris landfill which will accept the waste materials. The Contractor will provide equipment and personnel to transport the manifested materials to their designation point(s).

Estimated timeframe: 25 business days

#### **TASK 10 Confirmatory Sampling Program**

Wipe samples will be taken of the remaining on-site surface areas as described in the Work Plan to determine the effectiveness of the clean-up effort.

Estimated timeframe: 5 business days

**TASK 11 Analytical Results/Evaluation of Data**

The samples obtained during the Confirmatory Sampling Round will be analyzed by Commonwealth Analytical Laboratory. The estimated timeframe is based on typical laboratory turn around time.

Estimated timeframe: 25 business days

**TASK 12 Submit Report USEPA**

Tighe & Bond will review analytical data generated during the Confirmatory Sampling Round and prepare a detailed report to this USEPA as outlined in the Work Plan. No contingency time is included at this time for additional spot clean-up at those locations where threshold levels may be exceeded.

Estimated timeframe: 15 business days

The tasks identified above will be completed in 175 days, weather permitting. A summary of the project schedule is shown in the attached GANTT chart.

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**PHASE II PROJECT SCHEDULE  
LAKE SALVAGE SITE  
Chicago, Illinois**

[illegible]

**APPENDIX B**

**HEALTH AND SAFETY PLAN**

# **SITE HEALTH AND SAFETY PLAN**

for

Phase II Site Activities  
Lake Salvage Site  
2527-29 West Lake Street  
Chicago, Illinois

by

Tighe & Bond, Inc.  
53 Southampton Road  
Westfield, MA 01085  
413-562-1600

October 1994

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## SITE SPECIFIC HEALTH AND SAFETY PLAN

1.0 Purpose - The purpose of this health and safety plan (HSP) is to provide standards for Tighe & Bond worker safety and protection during activities conducted at the Lake Salvage Site. Contractors working at the site should prepare their own health and safety plan which, at a minimum, should comply with requirements set forth in this plan. The plan outlines standards and mandatory procedures relative to physical and chemical hazards encountered at sites, communication, training, worker health monitoring, decontamination procedures and levels of personnel protection. Any questions concerning this information should be directed to Tighe & Bond Certified Industrial Hygienist, Mr. Michael J. Matilainen or Project Manager, Zen Kruczkowski, P.E., at 413-562-1600.

2.0 Applicability - This plan is applicable to all personnel working at sites where mandatory worker health and safety training is required by State or Federal agencies in accordance with 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER). It is intended for use at sites where information regarding potential site hazards is available in the form of background research, personal communication with past or present property owners or workers, previous sampling results, etc. Activities to which this plan is applicable may include:

- Phase II        -        Site Assessment (Sampling)
- Removal/disposal of residual ash and building demolition
- Inspection of Contractor activities

This plan does not cover specific procedures for entry into trenches deeper than 5 feet, test pit excavations or confined spaces. Project-specific attachments should be prepared and appended to the site hazard evaluation summary if those activities are planned. Work of this nature shall be performed in accordance with 29 CFR 1926.650 subpart P "Excavation, Trenching and Shoring", 29 CFR 1910.146 "Permit Required Confined Space Entry" and the Tighe & Bond "Employee Confined Space Entry Program".

This plan is applicable only when provided in conjunction with the mandatory site specific hazard evaluation (Appendix A), health and safety guidelines (Appendix B) and site map (Appendix C). Site specific information (hospital, emergency number, etc.) is located in (Appendix A).

3.0 Site Control - Work Zones - Specific work zones have been identified in Appendix A, Section D to control work site access and exposure. Whenever possible, efforts should be made to minimize potential exposures at the sites. These can include but are not limited to remote sampling/materials handling, positioning workers upwind of work activities and rotation of employees.

The Contractor shall establish its own system to control access to the site. This system shall incorporate work zones into the layout of the site. The work zones shall include the Support Zone, Contamination Reduction Zones, and Exclusion Zones (active intrusive

work areas). The system shall assure that only authorized persons enter active intrusive work areas.

The Contractor shall restrict access and mark the outer limits of the active intrusive work areas with approved high visibility barrier tape or flagging and signs warning unauthorized personnel not to enter.

If various construction activities are concurrent, the Contractor shall establish a means of communication between the active work areas. The Contractor shall also establish a means of communication between workers within the same work area.

4.0 General Personnel Protection - Personal protective equipment and safety requirements must be appropriate to protect against the known or worst potential hazards on the site. Protective equipment should be selected based on the concentrations and possible routes of exposure to known or potential worst case substances. The levels of personnel protective equipment and upgrade requirements are generally described in Section 8 and 10 and more specifically defined on forms 2 and 3 (Appendix A).

It is anticipated that Level D or C protection and basic site safety measures will be sufficient at this site. Any conditions warranting upgrading the primary level of protection to Level B or A will be cause for all personnel to immediately leave the work site with subsequent implementation of the Contingency Plan. The site will be re-evaluated by the CIH and the work procedures will be modified as necessary to ensure appropriate health and safety procedures are implemented.

The specific respiratory protective device selected for Level C or D Modified protection shall be the device identified on each individual's respirator fit test, as described in Section 5.3. In general, respirators will be supplied with combination cartridges for organic vapors, dusts, mists, and acid gases and shall be approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health. In the event that site monitoring identifies the potential for exposure to other chemical substances (i.e. formaldehyde, ammonia), additional cartridges will be made available as necessary at the site.

5.0 Communications and Training - Workers at state and federally listed or recognized sites must be provided with adequate information and training to recognize and evaluate potential hazards. All persons entering the site will be required to read and understand this HSP and acknowledge by signing Form #8 (Appendix A). Training shall comply with applicable regulations including 29 CFR 1910.120 "HAZWOPER" and 29 CFR 1910.1200 "Hazard Communication Standard".

5.1 Communication - The Project Manager shall supply all on-site personnel with a site-specific hazard evaluation summary to be used in conjunction with this plan. The summary shall cover, at a minimum, the following topics:

- a. A brief description of the history of the location with regards to health and environmental hazards.

- b. A description of the activities to which the hazard evaluation summary is applicable.
- c. A description of any hazards which may be encountered, including:
  - 1. Physical Hazards - terrain, traffic, equipment, severe weather (heat stress and frostbite), electrical hazards, noise.
  - 2. Chemical Hazards - materials used and stored at the site, materials released at the site.
  - 3. Biological Hazards - insects, plants, animals, pathogens, infectious materials.
- d. A description of the levels of protection selected for the operation.
- e. Equipment decontamination procedure if different from those specified herein.
- f. Summary of emergency contacts for use in the event of fire, explosion, medical emergency or other emergency, including the location of the nearest telephone and an address and phone number to provide to emergency personnel.
- g. A map showing the route to the nearest hospital.
- h. A summary of available recent monitoring data and relevant chemical information.
- i. If available, health and safety guidelines and Material Safety Data (MSD) sheets will be included in Appendix B for Tighe & Bond only. All other contractors should provide copies of MSD's to Tighe & Bond for inclusion in this plan.

**5.2 Health and Safety Training** - All contractor personnel shall have health and safety training as outlined in 29 CFR 1910.120(e). Copies of current training documentation for site workers will be available at the site. Documentation for Tighe & Bond employees will be maintained at a central location at the Tighe & Bond office.

**5.3 Respirator Usage Training and Fit Testing** - Prior to assignment to a site where respirator use may be required, employees will be provided with respirator training as outlined in 29 CFR 1910.134(e)(5). Respirator fit tests are to be conducted at 6 to 10 month intervals, or at any time when a condition that may change the fit of a respirator has occurred, such as change in weight, change in

facial structure, extensive dental work, etc. All use of respirators shall comply with Tighe & Bond's written respiratory program.

**6.0 Decontamination Procedures** - A general summary of the decontamination procedures is presented on Form #4 (Appendix A). The following details this information.

**6.1 Personnel Decontamination** - If Level D protection is used, any disposable inner gloves or protective clothing should be sealed in a plastic bag and properly disposed of. Moisture resistant outer gloves and outer boots should be rinsed to remove gross contaminants, and then sealed in a plastic bag. Any further decontamination required should be performed at the laboratory. Disposable equipment should be used whenever possible.

If Level C/D modified or greater protection is used, personnel are required to follow the decontamination procedures listed below, as they apply to the gear being worn:

- a) Wash boots thoroughly with clean water or an appropriate cleaning solution to remove gross contaminants.
- b) Scrub down outer boots in decon solution and rinse with water.
- c) Remove boots.
- d) If wearing reusable rain gear, it should be cleaned in a similar manner as the boots.
- e) Disposable Tyveks should be removed and placed in a plastic bag.
- f) Remove outer gloves and wash in same manner as boots while wearing disposable inner gloves.
- g) Use a new set of disposable gloves to clean additional equipment including hard hat, safety glasses, etc.
- h) Remove respirator last and dispose of spent cartridges in a plastic bag.
- i) If Contractor's employees are showering due to lead or asbestos exposure, all employees at the site shall utilize similar decontamination procedures. Otherwise, exposed personnel shall wash face and hands.
- j) Decontamination wash and rinse water will be allowed to percolate into the ground or as specified.

**6.2 Equipment Decontamination** - Proper decontamination of all equipment is necessary to avoid transferring contaminants from the site, thereby increasing



potential for exposure of on-site and off-site personnel. The measures described below should be followed prior to leaving all sites, as applicable to the equipment being used. Any variations from the procedures described below for reasons of worker health or safety must be approved by the Project Manager.

These measures are separate from, and may not be substituted for, other decontamination procedures associated with proper sampling protocol

- a) Sampling equipment such as measuring tapes and bailer cords may be decontaminated at the sampling area. The equipment may be thoroughly rinsed with clean water or an appropriate cleaning solution and wiped dry with paper towels before leaving the work site. Alternatively, they may be wrapped in absorbent material and/or stored in plastic bags sealed to prevent contact with workers, vehicles, etc.

If further field decontamination is required, rinse with water, then methanol, then distilled water. Contain methanol and properly dispose of.

- b) The rinse water from this operation will be allowed to percolate into the ground or as specified.

**6.3 Heavy Equipment Decontamination** - Decontamination of drilling equipment including drill rigs, backhoes, drill rods, augers, etc., will take place at the site of each boring/monitoring well or test pit prior to moving to subsequent locations. Decontamination of such equipment will entail a thorough steam cleaning, or washing and rinsing of the equipment with high pressure water followed by air drying. In addition, the tires and undercarriages of vehicles exiting areas identified as having surficial hazardous materials will be sprayed with high pressure water and allowed to dry before leaving the contaminated area.

If necessary, the Contractor shall construct an approved decontamination pad within the Contamination Reduction Zone(s) for removing soil from all vehicles and equipment leaving the Exclusion Zone(s). The decontamination pad(s) shall include a high-pressure water wash area for equipment and vehicles. It shall be constructed of gravel over a vinyl liner. At the bottom center of the liner shall be a collection system for drainage of washwater into a sump at the side of the pad. The decontamination pad shall be constructed so that all water will flow towards the sump. The sump shall be constructed to accommodate a 55-gallon drum equipped with a submersible, float-activated pump. The washwater accumulating in the sump shall be pumped into temporary storage tanks. A designated clean area shall be established within the Contamination Reduction Zone(s) for performing equipment maintenance.

In general, any item taken into the Exclusion Zone will be assumed to be contaminated and shall be carefully inspected and decontaminated before the item leaves the area. All items shall be decontaminated to the satisfaction of the Engineer prior to leaving the area. All construction material shall be handled and

brought on site in such a way as to minimize the potential for contaminants being carried off site. Separate, clearly-marked parking and delivery areas shall be established.

6.4 Containment and Disposal - Contaminated soil brought to the surface during any well installation or soil excavation activities with a total organic vapor concentration (TOV) greater than 10 ppm as registered by the field HNu or visually contaminated will be segregated into an area lined with 6 mil (minimum) polyethylene. The piles will be surrounded by an earth berm, and will be covered with 6 mil (minimum) polyethylene pending proper disposal or reuse.

Contaminated clothing and equipment shall be characterized and disposed of by the remediation contractor in conjunction with the owners waste disposal plan.

7.0 Emergency Procedures - Follow the site specific contingency plan shown on Form #1 (Appendix A) and employ the following general procedures during all work.

7.1 Inhalation Exposure

- a) If warning signals such as: dizziness, nausea, headache, shortness of breath, burning sensation in the mouth, throat or lung or symptoms specific to hazard found at the site are apparent, the victim should leave the contaminated air space immediately. Have someone contact emergency services. Obtain health and safety information about potential contaminants such as MSD sheets.
- b) If unconscious, the victim should be pulled out of the contaminated area immediately if they do not have any injuries which would prohibit moving them (i.e. spinal injury). The rescuers should make sure that the area is safe to enter. If the area can not be safely entered, attempt to ventilate this area. Do not attempt a rescue. Rescuers should make sure they are properly trained in First Aid and rescue and that they are wearing proper respiratory and protective equipment before attempting the rescue.
- c) If the victim is no longer breathing, mouth-to-mouth resuscitation or some other form of artificial respiration should be administered by a person who is properly trained and certified in a location away from the contaminated area (if possible).

Medical attention should be obtained as soon as possible.

7.2 Skin Exposure - The skin should be washed with copious amounts of soap and water. If clothing is contaminated, it should be removed immediately and the skin washed thoroughly with running water. If a shower is available, it should be used immediately and clothes should be removed while showering. This procedure may be life-saving as certain highly toxic chemicals are rapidly absorbed through the skin.

All contaminated parts of the body, including the hair, should be thoroughly decontaminated. It may be necessary to wash repeatedly.

7.3 Ingestion - A poison control center or emergency service should be contacted immediately to determine an appropriate course of action. If possible, have health and safety information on the poison available when you call for help. Vomiting should be induced except when the substance presents an aspiration hazard, such as from a petroleum product; or when the substance is strong acid or alkali. To induce vomiting, a tablespoon of salt or powdered mustard in a glass of warm water or syrup of ipecac from the First Aid Kit can be taken as an emetic.

Drinking plenty of water and placing a finger down the throat may also be effective in inducing vomiting. The treatment should be repeated until vomit is clear.

Medical attention should be obtained immediately.

7.4 Eyes - If a toxicant should get in the eyes, they should be washed with plenty of water. The eye itself should be held open, rotated, and flooded with water so that all surfaces are washed thoroughly. Washing should be continued for at least 15 minutes.

Medical attention should be obtained immediately.

7.5 Exposure to Heat or Cold - When working under severe weather conditions, personnel should be aware of the signs of heat stress, hypothermia and frostbite as well as the appropriate response actions.

Procedures to monitor, avoid, and treat heat/cold stress shall be established in accordance with "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, October 1985; U.S. Dept. of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety Health; Publication No. 85-115.

Field implementation of the Heat/Cold Stress Prevention Plan shall be performed by a person with current first aid/CPR certification who is trained to recognize symptoms of heat and cold stress.

- a) Heat Stress - If a worker shows signs of heat stroke (dry, hot, red skin, high body temperature) or heat exhaustion (cool, moist, pale or red skin, dilated pupils, nausea, dizziness), the worker must be removed from the work area and cooled. Loosen clothing, elevate feet, and provide cool liquids. Heat stroke can be life threatening and requires rapid action and medical attention.

- b) Hypothermia - If a worker shows signs of hypothermia (shivering, impaired judgement, drowsiness, clumsiness) the worker must be removed from the work area and warmed gradually.
- c) Frostbite - If a worker shows signs of frostbite (skin color changes to white or grayish-yellow then grayish-blue), the worker must be moved to a warm place. The affected area should be placed in warm (100-105°F) water. Do not rub or massage.

7.6 Stings and Bites - If still present, remove stinger with fingernail. Work the site with soap and water. Cover with bandage and apply ice. If severe allergic reactions appear (hives, itching, rash, nausea, vomiting, dizziness, swelling) seek medical attention immediately.

7.7 Emergency Equipment and First Aid Requirements - The Contractor shall provide the following equipment during all work at this site.

- A. Fire Extinguisher: The type and number of fire extinguisher shall be determined by the Contractor. Inspection and maintenance shall be the responsibility of the Contractor. At least one 20-lb type ABC fire extinguisher shall be located at each entrance to each active work area with additional units located in on-site offices, and on each piece of heavy construction equipment such as dozers and compactors. These fire extinguisher shall be utilized for putting out equipment or personnel fires and not to be employed as sole fire fighting equipment for large site fire.
- B. Emergency Eye Wash/Shower: Portable emergency eye wash/shower units shall be provided by the Contractor. These portable units shall be protected from freezing and shall be located close to each work area and at each equipment decontamination station. The emergency eye wash / shower units shall meet the requirements specified in ANSI Z358.1-1981.
- C. First Aid Kits: The size and number of kits shall be sufficient for the maximum number of people on site at one time. The kits shall be equipped as per the recommendations of an occupational physician and shall be able to provide stabilization for patients requiring off-site treatment and general first aid. The first aid kit locations shall be specially marked and provided with adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions.
- D. On-Site Emergency Vehicle: The Contractor shall provide at all times while on-site work proceeds, a designated emergency vehicle which shall be used to transport injured personnel to the hospital for treatment. This vehicle shall at all times contain a map showing the route and written directions to the hospital.

8.0 Levels of Personal Protection Equipment (PPE) - Selection of personal protective equipment shall be based on the potential toxicity or physical dangers associated with hazardous materials and possible routes of exposure. Based on known or anticipated hazards, personnel shall be required to wear a minimum of Level D protection. The adequacy of personal protection shall be confirmed through air monitoring conducted by the Site Health and Safety Officer (SHSO) as described in Section 10 and Form 5 (Appendix A). If the need to upgrade the level of personal protection arises, the SHSO shall provide his personnel with the appropriate equipment. PPE selection, evaluation, and re-selection is an on-going process directly related to the change in conditions as encountered at the site.

While this plan is not generally intended for use at sites where levels A or B are required, all four Levels (A through D) are described below. Additional information on specific types of PPE by task can be found on Forms #2 and #3 in Appendix A. Workers should leave the site pending further evaluation if conditions requiring Level A or Level B protection are observed or detected.

8.1 Level A - Level A protection should be worn when the highest available level of respiratory, skin, and eye contact protection is needed. While Level A provides the maximum available protection, it does not protect against all possible airborne or splash hazards. For example, suit material may be rapidly permeable to certain chemicals in high air concentrations or heavy splashes.

**A. Personnel Protection Equipment**

- Positive pressure self contained breathing apparatus (SCBA), OSHA\NIOSH approved, operated in the positive pressure demand mode.
- Totally encapsulated suit (boots and gloves attached).
- Gloves - inner (tight-fitting and chemical-resistant).
- Boots - chemical-protective, steel toe and shank. Depending on suit boot construction, worn over suit boot.
- Gloves - outer, chemical-resistant. Depending on suit construction, worn over suit gloves. May be replaced with tight-fitting, chemical-resistant gloves worn inside suit gloves.
- Underwear - cotton, "long-john" type (optional).
- Hard hat (under suit).
- Disposable protective suit, gloves and boots. Worn under or over encapsulating suit.

- Coveralls (under suit).
- 2-way radio communications.

**B. Criteria for Use**

**Use Level A:**

1. When the type(s) and concentrations(s) of toxic substances are known to require the highest level of combined protection to the respiratory tract, skin, and eyes. These conditions would be:
  - a) Atmospheres which are "immediately dangerous for life and health" (IDLH). IDLH's are detailed in the NIOSH/OSHA's "Pocket Guide to Chemical Hazards" and/or other references.
  - b) Known atmosphere or potential situations that would affect the skin or eyes, or could be absorbed into the body through these surfaces in toxic quantities.
    - Potential situations are those where vapors may be generated or splashing may occur through site activities.
    - Standard reference books should be consulted to obtain concentrations hazards to skin, eyes, or mucous membranes.
    - Oxygen deficient atmospheres with above conditions.
2. At sites where the type(s) and/or potential concentration(s) of toxic substances are unknown.
  - a) Unless there is information available to strongly indicate otherwise, the site should be presumed to present hazards to the respiratory system, skin, and eyes. Level A protection would provide the highest level of protection for the initial entry team.
  - b) Enclosed areas such as confined spaces, railroad cars, ship holds, etc.
3. It is not anticipated that work will be done under conditions requiring Level A protection. If such conditions are encountered, operations will cease immediately and all personnel will

immediately leave the area. Workers shall not re-enter the area until the contingency plan specifically appropriate for such conditions has been implemented, or until there is clear evidence that the conditions requiring Level A protection have abated.

8.2 Level B - Level B protection should be selected when the highest level of respiratory protection is needed, but exposure to the small unprotected areas of the body (i.e. neck and back of head) is unlikely, or where concentrations are known to be within acceptable exposure standards.

**A. Personnel Protective Equipment**

- Positive pressure SCBA, OSHA/NIOSH approved, operated in the positive pressure demand mode.
- Hooded, two-piece chemical-resistant suit.
- Gloves - outer, chemical-protective.
- Boots - outer (chemical-protective, steel toe and shank).
- 2-way radio communications.
- Hard hat.
- Face shield (optional).

**B. Criteria for Use**

**Use Level B**

1. When the type(s) and concentration(s) of hazardous substances are known to require the highest degree of respiratory protection; but a lower level of skin protection, i.e. in
  - a) Atmospheres which are "immediately dangerous for life and health" (IDLH). Type(s) and concentration(s) of vapors in air do not present a hazard to the small, unprotected areas of the body.
  - b) Atmospheres with concentrations of known substances greater than protection factors associated with full-face, "air purifying" respirators with appropriate cartridges.
  - c) Atmospheres with less than 19.5 or greater than 23.5 percent oxygen; below 10 percent of the lower flammable limit or above the permissible exposure level.

2. When a determination is made that potential exposure to the body parts not protected by a fully encapsulated suit (primarily neck, ears, etc.) is highly unlikely.
3. Normal drilling and sampling operations will cease if conditions are such that Level B protection would be required.

8.3 Level C - Level C protection should be selected when the types and concentrations of respirable materials are known, have adequate warning properties, or are reasonably assumed to be not greater than the protection factors associated with air-purifying respirators; and exposure to the few unprotected areas of the body (i.e., neck and back of head) is unlikely to cause harm. Continuous monitoring of site and/or individuals should be established.

A. Personnel Protective Equipment

- Half-face, or full-face, air-purifying respirator (OSHA/NIOSH approved).
- Chemical-resistant outer clothing.
- Gloves - inner (tight-fitting, chemical-resistant type or woven liners).
- Gloves -outer (chemical resistant).
- Hard hat (face shield optional).
- Boots - outer (chemical-protective).
- Safety glasses.

B. Criteria for Use

1. Site known to contain potentially hazardous materials resulting in air concentrations requiring a protection factor afforded by a full-face or half-face, air-purifying respirator (OSHA/NIOSH approved).
2. Well-documented, reliable history of site and patterns of prior entry.
3. No evidence to suspect acute or chronic toxicity to exposed skin.
4. Continuous air or personnel monitoring should occur while wearing Level C protection.



8.4 Level D - Level D is the basic work uniform and should be worn for all site operations. Level D should be selected when performing environmental sampling involving dilute concentrations of contaminants on sites that have been characterized by previous analyses or research. Modified Level D shall include the use of respirators designated at Level C.

**A. Personnel Protective Equipment**

- Standard work clothing.
- Optional disposable chemical-resistant clothing appropriate for known or expected levels of contamination.
- Boots/Shoes - safety or chemical-resistant boots.
- Safety glasses or safety goggles available.
- Gloves - disposable latex or cotton.
- Optional moisture resistant outer gloves.
- Hard hat available for drilling operations.

**B. Criteria for Use**

1. No indication of airborne health hazards present.
2. No gross indication of airborne contaminants above background.

9.0 Medical Monitoring - All contractor personnel engaged in on-site activities shall be participants in a medical monitoring program similar to the following. As participants in this program, these individuals will have had recent physical examinations.

The primary goal of this medical monitoring program is to provide evaluation and ongoing surveillance of the health status of employees potentially exposed to toxic substances as a result of their work-related activities. An active health monitoring program for those employees potentially at risk is an important tool in evaluating the effects of chronic low-level exposures or acute exposures related to operations at hazardous waste sites. The effects of low-level exposures may not become apparent until years after the initial exposure.

This medical monitoring program includes laboratory testing, personnel medical history evaluation, physical examination, and specific systematic testing.

Each participant in this medical monitoring program undergoes a complete occupational history evaluation, and baseline physical examination including the following parameters:

- Pulmonary Function Studies
- Complete Blood Count
- Chemical Blood Profile
- Urinalysis
- Chest X-Ray
- Electrocardiogram
- Specific parameters as necessary dependent upon exposure.

Following the establishment of each participant's baseline values for the above parameters, an annual re-evaluation is conducted to monitor potential changes due to work with hazardous materials.

In addition to this annual re-examination, provisions are made for specific post-exposure examinations in the event of a suspected exposure during a particular field event.

The program shall meet or exceed the minimum requirements established in OSHA standard 20 CFR 1910.120.

10.0 Air Monitoring - Real-time air monitoring at the work area and site perimeter will be required. The frequency of testing will be dependent upon the levels of contaminants detected during the Phase II assessment. Workers shall also be monitored to determine compliance with 29CFR 1910.1000 "Air Contaminants".

10.1 Real Time Monitoring - Real-time air monitoring shall be required of the Contractor during all intrusive and non-intrusive construction activities. Air monitoring instruments shall be calibrated regularly and all calibration and monitoring data shall be recorded in a field notebook. Each day, construction activities shall not begin until the instruments are checked out and background levels are determined and recorded.

Air shall be monitored for total volatiles (organic vapors) with a photoionization detector (HNU Model PI 101) or equivalent equipped with a standard probe containing a 10.2 eV lamp. Particulate matter shall be monitored with a particulate/aerosol monitor (MIE Model PDM-3 Miniram or equivalent).

Air monitoring action levels as shown below and appropriate responses shall be established by the Contractor and followed throughout intrusive and non-intrusive construction activities. All air monitoring results and field observations (i.e. wind speed, wind direction, humidity, precipitation, etc.) shall be recorded in a field notebook.

- A. Volatile Organic Compounds (VOC's) VOC's shall be monitored at the downwind perimeter of the Exclusion Zone daily at regular intervals. If total organic vapor levels exceed 5 parts per million (ppm) continuously above background, intrusive activities shall be stopped and corrective action taken.
- B. Particulates Particulates shall be continuously monitored downwind of the Exclusion Zone with a portable particulate monitor having an alarm set at 0.15 milligrams per cubic meter (mg/m<sup>3</sup>) or background. If downwind particulate levels, integrated over a period of 15 minutes, exceed 0.15 mg/m<sup>3</sup> or background, particulate levels upwind of the Exclusion Zone shall be measured. If the downwind particulate level is more than 0.10 mg/m<sup>3</sup> greater than the upwind particulate level, then all intrusive activities shall be stopped and corrective action taken.

Level C protection has been selected as the basic level of personal protection. However, the continuous air monitoring program will determine whether the level of protection may be downgraded or upgraded, as appropriate.

10.2 Worker Air Monitoring - Representative worker air monitoring shall be performed for each specific work operation. If airborne levels exceed one-half the permissible exposure levels established under various OSHA regulations; respiratory protection will be required in accordance with 29 CFR 1910.134.

C325\H&SVTEXT

Revised: November 14, 1994

**APPENDIX A**

***Site Hazard Summary***  
**Forms #1 - 8**

## APPENDIX A

### SITE HAZARD SUMMARY

**Scope of Work:** The Lake Salvage site in Chicago, Illinois was used as a metal scrap yard and wire reclamation facility. A full site assessment will be performed to determine areas of residual contamination. The areas of contamination will be identified, cleaned up and the building will be demolished. The following information addresses specific issues expected to be encountered during the project.

#### **A. PHYSICAL HAZARDS**

1. Building - The building is in an extremely deteriorated condition. Exercise caution in all areas of the facility.
2. Electrical - There are overhead electrical lines and utilities entering the facility. Notify local utilities for clearance.
3. Traffic - Exercise caution around heavy machinery. Maintain eye contact with operators at all times.
4. Overhead - Hard hats are required due to the condition of the building and proposed demolition activities.
5. Terrain - There is much debris over the facility. Exercise caution on walking surface to minimize trips, slips or falls. Use work boots to minimize foot injuries.
6. Confined Spaces - Enclosed spaces with poor ventilation require special work practices.

#### **B. CHEMICAL HAZARDS**

1. Materials Used or released at the site include asbestos, lead (paint and soil), dioxins, polychlorinated biphenyls (PCB's).
2. Materials brought onto site during the work can include gasoline, oils, greases and other cleaning chemicals.
3. Confined Space areas can contain oxygen deficient atmospheres, combustible environments or toxic environments. (i.e. hydrogen sulfide) These can include test pits.

Carbon monoxide may also be present when internal combustion engines are run in poorly ventilated areas.

**C. BIOLOGICAL HAZARDS**

- Insects - mosquitos, ticks, cock roaches
- Poisonous Plants - none expected
- Animals - rodents
- Pathogens/infectious materials - Animal droppings

**D. WORK ZONES** - The following describe the Exclusion, Contamination Reduction and Support Zones.

- Exclusion Area within thirty feet of all excavation, drilling or heavy equipment work and area within the fence. It is expected that the contractor will repair the fence to ensure site security.
- Contamination Reduction Area between Exclusion and Support Zones at gate entrance.
- Support Zone A 40 foot by 40 foot area immediately adjacent the fenced area.

FORM #1

EMERGENCY CONTACTS / CONTINGENCY PLAN

Telephone Availability:

       available on site

  X   available nearby at Pay phone at corner of Western and W. Lake.

City of Chicago, Illinois

Distance and Directions to Site from Nearest Main Road.

See Appendix C - Site Map.

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<u>Emergency Contact</u>	<u>Name</u>	<u>Phone #</u>
Health & Safety Manager	Michael Matilainen CIH	413-562-1600
Project Manager	Zen Kruczkowski, P.E.	413-562-1600
Contractor Site Safety Coordinator	NA	NA
Client Contact	Ted Craver	(703) 413-3916
Environmental Agency (US EPA)	Fred Bartman	(312) 886-0776
Health Department	NA	NA
Fire Department	NA	911
CHEMTREC (call in the event of chemical release, fire, or explosion)	NA	1-800-424-9300

FORM #1 (CONTINUED)

Police Department  
(call in the event of injury,  
heat stress, frostbite,  
chemical exposure)

NA

746-6000 (non-emergency)  
911 (emergency)

State Police

NA

NA

Poison Control Center  
(call in the event of poisoning by  
ingestion, inhalation, etc.)

NA

942-5969

Hospital  
(see map in Appendix C  
for best route to hospital)

St. Mary of Nazareth

770-2000

Be prepared to provide emergency personnel with the following:

- Phone number at site: Cellular phone will be on-site
- Address of site: 2527-29 West Lake Street, Chicago
- Nearest cross road: Western Avenue
- Hazard exposed to: \_\_\_\_\_
- Any vital signs (pulse, breathing, etc.) \_\_\_\_\_

**CONTINGENCY PLAN:**

Solo T&B representatives will not enter or remain in the work area unless accompanied by contractor or facility personnel. The buddy system will be maintained at all times. If site personnel observe hazards for which they have not prepared, they will withdraw from the area and notify the owner, engineer and the health and safety manager. Stay upwind and keep out of low lying areas. If possible, take immediate measures to control and contain releases within the area site boundaries. Allow no sparks (e.g. vehicle startups), smoking or flames in the hazard area. Keep unnecessary people away, isolate the area and deny entry.

T&B may rely on instruments operated by contractor personnel only upon T&B health and safety manager approval. If contractor directs a higher level of protection than this plan, T&B personnel will wear that level. T&B personnel may choose to wear more protection than that directed in this plan.

If T&B has no B-level supervisor on the site when air contaminant levels exceed those at which Level B is needed, T&B will leave the contaminated area.



# **FORM #2 - PPE BY TASK**

TASK DESCRIPTION	Type of Work	Personal Protective Equipment	
		Primary	Contingency
1 All Sampling (see attached site map)	(X) Intrusive ( ) Non-intrusive	( ) A ( ) B (X) C ( ) D (X) Modified	( ) A (X) B ( ) C ( ) D (X) Exit Area
2 Remediation/Demo- lition/Decontamination	(X) Intrusive ( ) Non-intrusive	( ) A ( ) B (X) C ( ) D (X) Modified	( ) A (X) B ( ) C ( ) D (X) Exit Area
3 Facilities Inspection	( ) Intrusive (X) Non-intrusive	( ) A ( ) B (X) C ( ) D (X) Modified	( ) A (X) B ( ) C ( ) D (X) Exit Area
<b>PERSONNEL AND RESPONSIBILITIES FOR PPE (include subcontractors)</b>			
<b>NAME</b>	<b>FIRM</b>	<b>RESPONSIBILITIES</b>	<b>On Site?</b>
Michael Matilainen CIH	T&B	Health and Safety	No
Zen Kruczkowski, P.E.	T&B	Site Supervision	Yes

C325\H&S\FORM-2

**FORM #3 - PPE DESCRIPTION**

(Specify by task. Indicate type and/or material, as necessary. Group tasks if possible.  
Use copies of this sheet if needed)

TASKS: (X)1(X)2(X)3( )4( )5( )6( )7( )8  
LEVEL: ( )A( )B( )C(X)D-(X)Modified  
(X) Primary ( ) Contingency

Respiratory: (X) Not needed See Note  
( ) SCBA, Airline:  
(X) APR: Full/half face  
(X) Cartridge: Dust/mist/organic vapor  
( ) Escape Mask:  
( ) Other:  
Note: Respirators required only if above  
action levels.

Head and Eye: ( ) Not needed  
(X) Safety Glasses: Powered Equipment  
( ) Face Shield:  
( ) Goggles:  
(X) Hard Hat:  
( ) Other:

Boots: ( ) Not needed  
(X) Steel-Toe  
( ) Rubber  
(X) Overboots: Nitrile  
( ) Steel Shank  
(X) Leather

Prot. Clothing: ( ) Not needed  
( ) Encapsulated Suit:  
( ) Splash Suit  
( ) Apron:  
(X) Tyvek Coverall (optional)  
(X) Saranex Coverall  
( ) Cloth Coverall:  
( ) Other:

Gloves: ( ) Not needed  
(X) Undergloves: (Surgical)  
(X) Gloves: Nitrile  
(X) Overgloves: Leather

Other:

\*Hearing protection during drilling or high  
noise levels

TASKS: (X)1(X)2(X)3( )4( )5( )6( )7( )8  
LEVEL: ( )A(X)B( )C( )D-(X)Modified  
( ) Primary (X) Contingency

Respiratory: ( ) Not needed  
(X) SCBA, Airline:  
( ) APR:  
( ) Cartridge:  
( ) Escape Mask:  
( ) Other:

Head and Eye: ( ) Not needed  
(X) Safety Glasses:  
( ) Face Shield:  
(X) Goggles:  
(X) Hard Hat:  
( ) Other:

Boots: ( ) Not needed  
(X) Steel-Toe  
( ) Rubber  
(X) Overboots: Nitrile  
( ) Steel Shank  
(X) Leather

Prot. Clothing: ( ) Not needed  
( ) Encapsulated Suit:  
( ) Splash Suit  
( ) Apron:  
(X) Tyvek Coverall  
(X) Saranex Coverall  
( ) Cloth Coverall:  
( ) Other:

Gloves: ( ) Not needed  
(X) Undergloves: (Surgical)  
(X) Gloves: Nitrile  
(X) Overgloves: Leather

Other:

\*Contact CIH for contingency upgrade to  
Level B

## FORM #4 - DECONTAMINATION PROCEDURES

<p><b>Personnel Decontamination</b>  <i>Summarize below or attach diagram;</i>  Team members will remove their protective clothing in the following order:</p> <ol style="list-style-type: none"> <li>1. Equipment drop</li> <li>2. Boot cover</li> <li>3. Outer glove removal</li> <li>4. Hard hat removal</li> <li>5. Coverall removal</li> <li>6. Surgical glove removal</li> <li>7. Respirator removal</li> <li>8. Hand and face wash</li> <li>9. Shower required if exposed to asbestos or lead</li> <li>10. PPE Air Dry</li> </ol>	<p><b>Sampling Equipment Decontamination</b>  <i>Summarize below or attach diagram;</i></p> <ol style="list-style-type: none"> <li>1. Gross removal of dirt</li> <li>2. Water rinse</li> <li>3. Cleaning solution</li> <li>4. Place in bag return to lab for final cleaning</li> <li>5. If further in-field decontamination required</li> <li>6. Steam cleaning (if applicable)</li> <li>7. Tap water rinse</li> <li>8. Methanol rinse</li> <li>9. Distilled water rinse</li> <li>10. Air Dry</li> </ol>	<p><b>Heavy Equipment Decontamination</b>  <i>Summarize below or attach diagram;</i></p> <ol style="list-style-type: none"> <li>1. Heavy equipment will be decontaminated by contractor prior to leaving the site</li> <li>2. Steam cleaning, or high pressure washing</li> <li>3. Water Rinse</li> <li>4. Air Dry</li> </ol>
<p><b>Containment and Disposal Method</b></p> <p>Protective equipment will be disposed of through the contractor's and/or client's waste stream. Place equipment in plastic bags. Small amounts of uncontaminated wastewater allowed to percolate back into the ground.</p>	<p><b>Containment and Disposal Method</b></p> <p>Small amounts of uncontaminated waste water allowed to percolate back into the ground. Methanol to be contained and disposed of.</p>	<p><b>Containment and Disposal Method</b></p> <p>Control of fluids from decontamination of heavy equipment will be the responsibility of the contractor.</p> <p>If necessary based on Phase II work, supply vehicle washdown area.</p> <p>Contaminated soil cuttings from drilling operations to be stockpiled, covered and characterized for disposal/or reuse.</p>

## FORM #5 - MONITORING EQUIPMENT

MONITORING EQUIPMENT			
TASK AND INSTRUMENT	ACTION GUIDELINES		COMMENTS (When and how often?)
1,2,3 Combustible Gas Indicator	0-10% LEL > 10% LEL	No explosion hazard Potential explosion hazard; notify CIH	( ) Not Needed (X) Continuous
1,2,3 Oxygen Deficiency Meter	> 23.5% O <sub>2</sub> < 19.5% O <sub>2</sub>	Oxygen enriched; interrupt task/evacuate/CIH Oxygen deficient; interrupt task/evacuate/CIH	( ) Not Needed (X) Continuous
1,2,3 Hydrogen Sulfide Meter	> 10 ppm H <sub>2</sub> S	Interrupt task/evacuate/notify CIH	( ) Not Needed (X) Continuous
1,2,3 Carbon Monoxide Meter	> 25 ppm CO	Interrupt task/evacuate/notify CIH	As needed basis
1,2,3 Photoionization Detector Instrument eV Lamp: 10.2 Type: HNU	Specify:	5ppm above background (continuous): Level D Modified 50 ppm above background continuous in breathing zone: evacuate and upgrade to Level B - Notify CIH Retest and continue work in Level D if <5 ppm continuous above background	( ) Not Needed (X) Continuous
2 Miniram Dust Monitor Type <u>PDM-3</u>	Specify:	0.10 mg/m <sup>3</sup> above background if over 0.15 mg/m <sup>3</sup> over 15 minute period mg: Level D modified	( ) Not Needed (X) Continuous
2 Lead/other Air Pumps/Sampling Media	Specify: > 30 µg/m <sup>3</sup> - Lead	Lead action level or one-half the permissible levels exposure cited in various OSHA regulations and "Air Contaminants" (29 CFR 1910.1000): Level D Modified	Representative Tasks
( )1( )2( )3 Detector Tubes Type _____ Type _____	Specify:		(X) Not Needed at this time

Note: If team notices unusual odors, or irritation of the eye or throat, they will leave the area.

# FORM #6 - PREVIOUS MONITORING DATA

Location	Media	Compound	Maximum Concentration	Sample Date
Waste Pile	Ash/Soil	Dioxin	156,000 pg/g	4/21/94
Waste Pile	Ash/Soil	Lead (TCLP)	62 mg/l	4/21/94
Waste Pile	Ash/Soil	Cadmium	0.36 mg/l	4/21/94
Waste Pile	Ash/Soil	Barium	1.3 mg/l	4/21/94
Waste Pile	Ash/Soil	Mercury	0.0059 mg/l	4/21/94
Waste Pile	Ash/Soil	PCB	16 mg/kg	4/21/94
Unknown	Wipe	Dioxin	19.5 pg/cm <sup>2</sup>	3/31/94
Unknown	Wipe	Dioxin	4.7 pg/cm <sup>2</sup>	3/31/94

pg/g or cm<sup>2</sup> - picogram per gram or square centimeter.

C325H&S\FORM-6

Revised: November 14, 1994

# FORM #7 - HEALTH AND SAFETY GUIDELINES FOR MAJOR CONTAMINANTS<sup>(1)</sup>

Known Contaminants	Highest Observed Concentration (units: ppm and media)	PEL/TLV ppm or mg/m <sup>3</sup> (specify)	IDLH ppm or mg/m <sup>3</sup> (specify)	WARNING SIGNS ppm or mg/m (specify)	MAIN SYMPTOMS/EFFECTS OF ACUTE EXPOSURE	PHOTO IONIZATION POTENTIAL (eV)
Lead	62 mg/l(s)	50 µg/m <sup>3</sup>	700 mg/m <sup>3</sup>	NA	Weakness, insomnia, abdominal pain, lead line	NA
Dioxin	156,000 pg/g(s)	NA	NA	NA	Chloracne - skin ailment	NA
PCB's	NA	0.5 mg/m <sup>3</sup>	NA	NA	Chloracne - skin ailments	NA
Hydrogen Sulfide	NA	10 ppm	300 ppm	0.77 ppm	Eye, nose & throat irritation, headache, dizziness, upset stomach, fatigue	10.46
Carbon Monoxide	NA	35 ppm	1500 ppm	NA	Headache, rapid breathing, nausea, weakness, dizziness, mental confusion	14.01
NA - Not Available    NE = None Established    U = Unknown S = Soil                      SW = Surface Water                      T = Tailings    W = Waste    TK = Tanks                      SD = Sediment A = Air                      GW = Ground Water                      SL = Sludge    D = Drums    L = Lagoons                      OFF = Off-Site						

Note: Other contaminants may be present at this site where incidental exposure may occur (gas, oil, grease for maintenance). Follow guidelines in Material Safety Data Sheets.

## FORM #8 - DOCUMENTATION

INSTRUCTIONS: Field personnel are required to receive a copy of the final health and safety plan (HSP), and to read, understand, and agree to the provisions of the plan. The Project Manager (PM) is responsible for distributing the HSP to personnel as they are assigned to the project. Personnel are required to sign this form indicating receipt of the HSP. The original of this form is maintained by the PM, and becomes part of the permanent project files. Copies of this form are to be sent to Michael J. Matalainen, CIH.

SITE NAME: Lake Salvage

LOCATION: 2527-29 West Lake Street, Chicago, Illinois

I have received a copy, read, understood, and agree to comply with the provisions of the above referenced HSP for work activities on this project.

PRINTED NAME/COMPANY	SIGNATURE	DATE

**APPENDIX B**

**Health & Safety Guidelines  
MSD Sheets**



# Occupational Health Guideline for Chlorodiphenyl (54% Chlorine)\*

## INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

## SUBSTANCE IDENTIFICATION

- Formula:  $C_{12}H_5Cl_5$  (approximately)
- Synonyms: Polychlorinated biphenyl; PCB
- Appearance and odor: Pale yellow viscous liquid with a mild hydrocarbon odor.

## PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for chlorodiphenyl (54% chlorine) is 0.5 milligram of chlorodiphenyl (54% chlorine) per cubic meter of air ( $mg/m^3$ ) averaged over an eight-hour work shift. NIOSH has recommended that the permissible exposure limit for polychlorinated biphenyls be reduced to 1.0 microgram per cubic meter of air averaged over a work shift of up to 10 hours per day, 40 hours per week, and that chlorodiphenyl (54% chlorine) be regulated as an occupational carcinogen. The NIOSH Criteria Document for Polychlorinated Biphenyls should be consulted for more detailed information.

## HEALTH HAZARD INFORMATION

### • Routes of exposure

Chlorodiphenyl (54% chlorine) can affect the body if it is inhaled, if it comes in contact with the eyes or skin, or if it is swallowed. It may be absorbed through the skin. Every effort should be made to prevent skin, eye, oral, or inhalation contact with this material.

### • Effects of overexposure

Chlorodiphenyl (54% chlorine) may cause irritation of the eyes, nose, and throat, and an acne-like skin rash. It

may also injure the liver, resulting in such effects as fatigue, dark urine, and yellow jaundice. Repeated skin contact with the liquid may cause skin irritation.

### • Reporting signs and symptoms

A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to chlorodiphenyl (54% chlorine). The production of liver tumors and adverse reproductive effects have been demonstrated in experimental animals following ingestion of polychlorinated biphenyls. The relevance to humans of some of these studies has not yet been established.

### • Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to chlorodiphenyl (54% chlorine) at potentially hazardous levels:

#### 1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the liver and skin should be stressed. Women in the work force should be advised of the potential adverse effects of chlorodiphenyl (54% chlorine) on the unborn child. Those who have borne children and work with chlorodiphenyl (54% chlorine) should be counseled concerning the advisability of nursing their offspring.

—Liver function tests: Chlorodiphenyl (54% chlorine) may cause liver damage. A profile of liver function should be obtained by utilizing a medically acceptable array of biochemical tests.

—Skin disease: Chlorodiphenyl (54% chlorine) is a defatting agent and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

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These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service    Centers for Disease Control  
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR  
Occupational Safety and Health Administration

- **Summary of toxicology**

Chlorodiphenyl (54% chlorine) vapor is toxic to the liver. Rats exposed to 5.4 mg/m<sup>3</sup> for 7 hours daily for 4 months showed increased liver weight and injury to the liver cells; 1.5 mg/m<sup>3</sup> for 7 months also produced histopathologic evidence of liver damage, which was considered to be of a reversible character. The vapor and the liquid are moderately irritating to the eye; contact with skin leads to removal of natural fats and oils with subsequent drying and cracking of the skin. Acne-form dermatitis (chloracne) due to exposure to chlorodiphenyl of 54% chlorine content has been reported but the period of exposure was not indicated. The production of liver tumors and adverse reproductive effects has been demonstrated in experimental animals following ingestion of polychlorinated biphenyls. The relevance to humans of some of these studies has not yet been established.

## CHEMICAL AND PHYSICAL PROPERTIES

- **Physical data**

1. Molecular weight: 326 (approximately)
2. Boiling point (760 mm Hg): 365– 390 C (689– 734 F)
3. Specific gravity (water = 1): 1.5
4. Vapor density (air = 1 at boiling point of chlorodiphenyl (54% chlorine)): 11.2
5. Melting point: 10 C (50 F) (pour point)
6. Vapor pressure at 20 C (68 F): 0.00006 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble
8. Evaporation rate (butyl acetate = 1): Much less than 1

- **Reactivity**

1. Conditions contributing to instability: Heat
2. Incompatibilities: Contact with strong oxidizers may cause fires and explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as hydrogen chloride and carbon monoxide) may be released in a fire involving chlorodiphenyl (54% chlorine).
4. Special precautions: Chlorodiphenyl (54% chlorine) will attack some forms of plastics, rubber, and coatings.

- **Flammability**

1. Flash point: 222 C (432 F)
2. Autoignition temperature: None to boiling point
3. Flammable limits in air, % by volume: Not available
4. Extinguishant: Foam, dry chemical, carbon dioxide

- **Warning properties**

Although chlorodiphenyl (54% chlorine) has a typical aromatic odor and causes eye irritation, this substance is treated as a material with poor warning properties, as no quantitative information is available concerning its odor and irritation thresholds. The AIHA *Hygienic Guide* states that the vapors of the chlorodiphenyls are

“moderately irritating to eye tissues,” but the concentrations which cause irritation are not stated.

## MONITORING AND MEASUREMENT PROCEDURES

- **General**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

- **Method**

Sampling and analyses may be performed by collection of chlorodiphenyl on a filter with subsequent extraction with petroleum ether and gas chromatographic analysis. An analytical method for chlorodiphenyl (54% chlorine) is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 2, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00260-6).

## RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

## PERSONAL PROTECTIVE EQUIPMENT

- Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with liquid chlorodiphenyl (54% chlorine).

- Clothing contaminated with liquid chlorodiphenyl (54% chlorine) should be placed in closed containers for storage until it can be discarded or until provision is

made for the removal of chlorodiphenyl (54% chlorine) from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the chlorodiphenyl (54% chlorine), the person performing the operation should be informed of chlorodiphenyl's (54% chlorine) hazardous properties.

- Non-impervious clothing which becomes contaminated with liquid chlorodiphenyl (54% chlorine) should be removed promptly and not reworn until the chlorodiphenyl (54% chlorine) is removed from the clothing.
- Employees should be provided with and required to use splash-proof safety goggles where liquid chlorodiphenyl (54% chlorine) may contact the eyes.

## SANITATION

- Skin that becomes contaminated with liquid chlorodiphenyl (54% chlorine) should be promptly washed or showered with soap or mild detergent and water to remove any chlorodiphenyl (54% chlorine).
- Eating and smoking should not be permitted in areas where liquid chlorodiphenyl (54% chlorine) is handled, processed, or stored.
- Employees who handle liquid chlorodiphenyl (54% chlorine) should wash their hands thoroughly with soap or mild detergent and water before eating, smoking, or using toilet facilities.
- Areas in which exposure to chlorodiphenyl (54% chlorine) may occur should be identified by signs or other appropriate means, and access to these areas should be limited to authorized persons.

## COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to chlorodiphenyl (54% chlorine) may occur and control methods which may be effective in each case:

Operation	Controls
Use as high-temperature transfer medium in chemical/food processing vessels and drying ovens	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as a dielectric in manufacture of transformers, capacitors, resistors, and other electrical apparatus	General dilution ventilation; local exhaust ventilation; personal protective equipment
Application and formulation as plasticizer, flame-retardant, and adhesive and weatherizer in spray surface coatings; manufacture and application of impregnants for cloth, paper, fiberboard, wood, and asbestos; manufacture and application of natural and synthetic waxes and polishes; manufacture and application of hot-melt and other adhesives	Process enclosure; general dilution ventilation; local exhaust ventilation; personal protective equipment
Use as non-flammable working fluid in vacuum pumps, hydraulic systems, and expansion systems	General dilution ventilation; local exhaust ventilation
Use during application of high-pressure, temperature, and moisture lubricants	Personal protective equipment
Use in compounding and processing of plastics for flame retardancy	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use in manufacture and application for use as pesticides and fungicides	Personal protective equipment
Use as an intermediate or raw material in further organic synthesis	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as sealer for gaskets of natural rubber and synthetics	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as adhesive release on tapes and ink release on carbonless duplicating paper; as a pigment carrier in dyeing polyesters and paper	Personal protective equipment

Use as a pressure adhesive for sign backings, insect traps, and tapes

Use in compounding mastics, and sealing and caulking materials; use in compounding of printing inks

General dilution ventilation; local exhaust ventilation; personal protective equipment

General dilution ventilation; local exhaust ventilation; personal protective equipment

## EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

### • Eye Exposure

If chlorodiphenyl (54% chlorine) gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.

### • Skin Exposure

If chlorodiphenyl (54% chlorine) gets on the skin, immediately wash the contaminated skin using soap or mild detergent and water. If chlorodiphenyl (54% chlorine) soaks through the clothing, remove the clothing promptly and wash the skin using soap or mild detergent and water. If irritation persists after washing, get medical attention.

### • Breathing

If a person breathes in large amounts of chlorodiphenyl (54% chlorine), move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

### • Swallowing

When chlorodiphenyl (54% chlorine) has been swallowed, get medical attention immediately. If medical attention is not immediately available, get the afflicted person to vomit by having him touch the back of his throat with his finger or by giving him syrup of ipecac as directed on the package. This non-prescription drug is available at most drug stores and drug counters and should be kept with emergency medical supplies in the workplace. Do not make an unconscious person vomit.

### • Rescue

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

## SPILL, LEAK, AND DISPOSAL PROCEDURES

• Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

• If chlorodiphenyl (54% chlorine) is spilled or leaked, the following steps should be taken:

1. Remove all ignition sources.
2. Ventilate area of spill or leak.
3. Collect for reclamation or absorb in vermiculite, dry sand, earth, or a similar material.

• Waste disposal method:

Chlorodiphenyl (54% chlorine) may be disposed of by absorbing it in vermiculite, dry sand, earth or a similar material and disposing in a secured sanitary landfill.

## ADDITIONAL INFORMATION

To find additional information on chlorodiphenyl (54% chlorine), look up chlorodiphenyl (54% chlorine) in the following documents:

- Medical Surveillance from the SCP
- Respiratory Protection from the SCP
- Personal Protection and Sanitation from the SCP
- NIOSH Criteria Document for Polychlorinated Biphenyls (September 1977)

These documents are available through the NIOSH Division of Technical Services, 4676 Columbia Parkway, Cincinnati, Ohio 45226.

## REFERENCES

- American Conference of Governmental Industrial Hygienists: "Chlorodiphenyl (54% Chlorine)," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.
- American Industrial Hygiene Association: "Chlorodiphenyls," *Hygienic Guide Series*, Detroit, Michigan, 1965.
- Christensen, H. E., and Luginbyhl, T. L. (eds.): *NIOSH Toxic Substances List*, 1974 Edition, HEW Publication No. 74-134, 1974.
- Fairhall, L. T.: *Industrial Toxicology* (2nd ed.), Williams and Wilkins, Baltimore, 1957.
- Kirk, R., and Othmer, D.: *Encyclopedia of Chemical Technology* (2nd ed.), Interscience, New York, 1968.
- National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: *Criteria for a Recommended Standard . . . Occupational Exposure to Polychlorinated Biphenyls*, HEW Publication No. (NIOSH) 77-225, U.S. Government Printing Office, Washington, D.C., 1977.
- Olivier, N.: "Chloracne," *Archives of Dermatology*, 99: 127-128, 1969.
- Patty, F. A. (ed.): *Toxicology*, Vol. II of *Industrial Hygiene and Toxicology* (2nd ed. rev.), Interscience, New York, 1963.

### \* SPECIAL NOTE

The International Agency for Research on Cancer (IARC) has evaluated the data on this chemical and has concluded that it causes cancer. See *IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man*, Volume 7, 1974; and Volume 18, 1978.

### RESPIRATORY PROTECTION FOR CHLORODIPHENYL (54% CHLORINE)

Condition	Minimum Respiratory Protection* Required Above 0.5 mg/m <sup>3</sup>
Vapor Concentration	
5 mg/m <sup>3</sup> or less	Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
Greater than 5 mg/m <sup>3</sup> ** or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.  A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against pesticides. Any escape self-contained breathing apparatus.

\*Only NIOSH-approved or MSHA-approved equipment should be used.

\*\*Use of supplied-air suits may be necessary to prevent skin contact while providing respiratory protection from airborne concentrations of chlorodiphenyl (54% chlorine); however, this equipment should be selected, used, and maintained under the immediate supervision of trained personnel. Where supplied-air suits are used above a concentration of 5 mg/m<sup>3</sup>, an auxiliary self-contained breathing apparatus operated in positive pressure mode should also be worn.





# Occupational Health Guideline for Chlorodiphenyl (42% Chlorine)\*

## INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

## SUBSTANCE IDENTIFICATION

- Formula:  $C_{12}H_7Cl_2$  (approximately)
- Synonyms: Polychlorinated biphenyl; PCB
- Appearance and odor: Colorless to dark liquid with a mild hydrocarbon odor.

## PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for chlorodiphenyl (42% chlorine) is 1 milligram of chlorodiphenyl (42% chlorine) per cubic meter of air ( $mg/m^3$ ) averaged over an eight-hour work shift. NIOSH has recommended that the permissible exposure limit for polychlorinated biphenyls be reduced to 1.0 microgram per cubic meter of air averaged over a work shift of up to 10 hours per day, 40 hours per week, and that chlorodiphenyl (42% chlorine) be regulated as an occupational carcinogen. The NIOSH Criteria Document for Polychlorinated Biphenyls should be consulted for more detailed information.

## HEALTH HAZARD INFORMATION

### • Routes of exposure

Chlorodiphenyl (42% chlorine) can affect the body if it is inhaled, if it comes in contact with the eyes or skin, or if it is swallowed. It may be absorbed through the skin. Every effort should be made to prevent skin, eye, oral, or inhalation contact with this material.

### • Effects of overexposure

Chlorodiphenyl (42% chlorine) may cause irritation of the eyes, nose, and throat, and an acne-like skin rash. It

may also injure the liver, resulting in such effects as fatigue, dark urine, and yellow jaundice. Repeated skin contact with the liquid may cause skin irritation. The production of liver tumors and adverse reproductive effects has been demonstrated in experimental animals following ingestion of polychlorinated biphenyls. The relevance to humans of some of these studies has not yet been established.

### • Reporting signs and symptoms

A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to chlorodiphenyl (42% chlorine).

### • Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to chlorodiphenyl (42% chlorine) at potentially hazardous levels:

#### 1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the liver and skin should be stressed. The skin should be examined for evidence of chronic disorders. Women in the work force should be advised of the potential adverse effects of chlorodiphenyl (42% chlorine) on the unborn child. Those who have borne children and work with chlorodiphenyl (42% chlorine) should be counseled concerning the advisability of nursing their offspring.

—Liver function tests: Chlorodiphenyl (42% chlorine) may cause liver damage. A profile of liver function should be obtained by utilizing a medically acceptable array of biochemical tests.

—Skin disease: Chlorodiphenyl (42% chlorine) is a defatting agent and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

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These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service    Centers for Disease Control  
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR  
Occupational Safety and Health Administration

#### • Summary of toxicology

Chlorodiphenyl (42% chlorine) vapor is toxic to the liver and causes an acne-form dermatitis (chloracne). Guinea pigs died at intervals up to 21 days after the first of 11 daily applications of 34.5 mg to the skin and, at necropsy, the liver showed fatty degeneration and central atrophy; rats, however, survived 25 daily applications, and only slight changes in the liver were observed. The vapor and liquid are moderately irritating to eye tissues. Cases of mild to moderate skin irritation with an acne-form eruption have been reported in workers exposed to 0.1 mg/m<sup>3</sup>; levels of 10 mg/m<sup>3</sup> were unbearably irritating. Several deaths due to atrophy of the liver have occurred among workers exposed to the fumes of chlorodiphenyls and chloronaphthalenes. The production of liver tumors and adverse reproductive effects has been demonstrated in experimental animals following ingestion of polychlorinated biphenyls. The relevance to humans of some of these studies has not yet been established.

## CHEMICAL AND PHYSICAL PROPERTIES

#### • Physical data

1. Molecular weight: 257.5 (approximately)
2. Boiling point (760 mm Hg): 325–366 C (617–691 F)
3. Specific gravity (water = 1): 1.38
4. Vapor density (air = 1 at boiling point of chlorodiphenyl (42% chlorine)): 8.9
5. Melting point: –19 C (–2 F) (pour point)
6. Vapor pressure at 20 C (68 F): 0.001 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble
8. Evaporation rate (butyl acetate = 1): Much less than 1

#### • Reactivity

1. Conditions contributing to instability: Heat
2. Incompatibilities: Contact with strong oxidizing agents may cause fires and explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as hydrogen chloride and carbon monoxide) may be released in a fire involving chlorodiphenyl (42% chlorine).
4. Special precautions: Chlorodiphenyl (42% chlorine) will attack some forms of plastics, rubber, and coatings.

#### • Flammability

1. Flash point: 176 C (349 F)
2. Autoignition temperature: None to boiling point
3. Flammable limits in air, % by volume: Not available
4. Extinguishant: Foam, dry chemical, carbon dioxide

#### • Warning properties

According to the AIHA *Hygienic Guide*, chlorodiphenyl (42% chlorine) has a typical aromatic odor and causes eye irritation. For the purposes of this guideline, however, it is treated as a material with poor warning

properties, as no quantitative data are available concerning its odor and irritation thresholds. As stated in the AIHA *Hygienic Guide*, the vapors of the chlorodiphenyls are "moderately irritating to eye tissues." The concentrations causing eye irritation are not mentioned.

## MONITORING AND MEASUREMENT PROCEDURES

#### • General

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

#### • Method

Sampling and analyses may be performed by collection of chlorodiphenyl (42% chlorine) on a glass fiber filter connected in a series with a midjet bubbler containing iso-octane, followed by gas chromatographic analysis. A detailed analytical method for chlorodiphenyl (42% chlorine) may be obtained from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161, under the title "NIOSH Analytical Methods for Set 2" (order number PB 271

## RESPIRATORS

• Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

• In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

## PERSONAL PROTECTIVE EQUIPMENT

• Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with liquid chlorodiphenyl (42% chlorine).





Use as a pressure adhesive for sign backings, insect traps, and tapes

Use in compounding mastics, and sealing and caulking materials; use in compounding of printing inks

General dilution ventilation; local exhaust ventilation; personal protective equipment

General dilution ventilation; local exhaust ventilation; personal protective equipment

## EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

### • Eye Exposure

If chlorodiphenyl (42% chlorine) gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.

### • Skin Exposure

If chlorodiphenyl (42% chlorine) gets on the skin, promptly wash the contaminated skin using soap or mild detergent and water. If chlorodiphenyl (42% chlorine) soaks through the clothing, remove the clothing promptly and wash the skin using soap or mild detergent and water. If irritation persists after washing, get medical attention.

### • Breathing

If a person breathes in large amounts of chlorodiphenyl (42% chlorine), move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

### • Swallowing

When chlorodiphenyl (42% chlorine) has been swallowed, get medical attention immediately. If medical attention is not immediately available, get the afflicted person to vomit by having him touch the back of his throat with his finger or by giving him syrup of ipecac as directed on the package. This non-prescription drug is available at most drug stores and drug counters and should be kept with emergency medical supplies in the workplace. Do not make an unconscious person vomit.

### • Rescue

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

## SPILL, LEAK, AND DISPOSAL PROCEDURES

- Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

- If chlorodiphenyl (42% chlorine) is spilled or leaked, the following steps should be taken:

1. Remove all ignition sources.
2. Ventilate area of spill or leak.
3. Collect for reclamation or absorb in vermiculite, dry sand, earth, or a similar material.

- Waste disposal method:

Chlorodiphenyl (42% chlorine) may be disposed of by absorbing it in vermiculite, dry sand, earth or a similar material and disposing in a secured sanitary landfill.

## REFERENCES

- American Conference of Governmental Industrial Hygienists: "Chlorodiphenyl (42% Chlorine)," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.
- American Industrial Hygiene Association: "Chlorodiphenyls," *Hygienic Guide Series*, Detroit, Michigan, 1965.
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## \* SPECIAL NOTE

The International Agency for Research on Cancer (IARC) has evaluated the data on this chemical and has concluded that it causes cancer. See *IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man*, Volume 7, 1974, and Volume 18, 1978.

## RESPIRATORY PROTECTION FOR CHLORODIPHENYL (42% CHLORINE)

Condition	Minimum Respiratory Protection* Required Above 1 mg/m <sup>3</sup>
Vapor Concentration	
10 mg/m <sup>3</sup> or less	Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
Greater than 10 mg/m <sup>3</sup> ** or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.  A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against pesticides. Any escape self-contained breathing apparatus.

\*Only NIOSH-approved or MSHA-approved equipment should be used.

\*\*Use of supplied-air suits may be necessary to prevent skin contact while providing respiratory protection from airborne concentrations of chlorodiphenyl (42% chlorine); however, this equipment should be selected, used, and maintained under the immediate supervision of trained personnel. Where supplied-air suits are used above a concentration of 10 mg/m<sup>3</sup>, an auxiliary self-contained breathing apparatus operated in positive pressure mode should also be worn.



use. Objective data can be obtained from an industry-wide study or from laboratory product test results from manufacturers of lead containing products or materials. The data the employer uses from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

(ii) The employer shall maintain the record of the objective data relied upon for at least 30 years.

(5) *Availability.* The employer shall make available upon request all records required to be maintained by paragraph (n) of this section to affected employees, former employees, and their designated representatives, and to the Assistant Secretary and the Director for examination and copying.

(6) *Transfer of records.* (i) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by paragraph (n) of this section.

(ii) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records required to be maintained by this section for the prescribed period, these records shall be transmitted to the Director.

(iii) At the expiration of the retention period for the records required to be maintained by this section, the employer shall notify the Director at least 3 months prior to the disposal of such records and shall transmit those records to the Director if requested within the period.

(iv) The employer shall also comply with any additional requirements involving transfer of records set forth in 29 CFR 1910.20(h).

(o) *Observation of monitoring.* (1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to lead conducted pursuant to paragraph (d) of this section.

(2) *Observation procedures.* (i) Whenever observation of the monitoring of employee exposure to lead requires entry into an area where the use of respirators, protective clothing or equipment is required, the employer shall provide the observer with and assure the use of such respirators, clothing and equipment, and shall require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the monitoring, observers shall be entitled to:

(A) Receive an explanation of the measurement procedures;

(B) Observe all steps related to the monitoring of lead performed at the place of exposure; and

(C) Record the results obtained or receive copies of the results when returned by the laboratory.

(p) *Effective date.* This standard (§ 1926.62) shall become effective June 3, 1993.

(q) *Appendices.* The information contained in the appendices to this section is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

(r) *Startup dates.* (1) The requirements of paragraphs (c) through (o) of this section, including administrative controls and feasible work practice controls, but not including engineering controls specified in paragraph (e)(1) of this section, shall be complied with as soon as possible, but no later than 60 days from the effective date of this section.

(2) Feasible engineering controls specified by paragraph (e)(1) of this section shall be implemented as soon as possible, but no later than 120 days from the effective date of this section.

#### Appendix A to § 1926.62—Substance Data Sheet for Occupational Exposure to Lead

##### 1. Substance Identification

A. *Substance:* Pure lead (Pb) is a heavy metal at room temperature and pressure and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.

B. *Compounds covered by the standard:* The word "lead" when used in this interim final standard means elemental lead, all inorganic lead compounds and a class of organic lead compounds called lead soaps. This standard does not apply to other organic lead compounds.

C. *Uses:* Exposure to lead occurs in several different occupations in the construction industry, including demolition or salvage of structures where lead or lead-containing materials are present; removal or encapsulation of lead-containing materials, new construction, alteration, repair, or renovation of structures that contain lead or materials containing lead; installation of products containing lead. In addition, there are construction related activities where exposure to lead may occur, including transportation, disposal, storage, or containment of lead or materials containing lead on construction sites, and maintenance operations associated with construction activities.

D. *Permissible exposure:* The permissible exposure limit (PEL) set by the standard is 50 micrograms of lead per cubic meter of air (50  $\mu\text{g}/\text{m}^3$ ), averaged over an 8-hour workday.

E. *Action level:* The interim final standard establishes an action level of 30 micrograms of lead per cubic meter of air (30  $\mu\text{g}/\text{m}^3$ ), averaged over an 8-hour workday. The action level triggers several ancillary provisions of the standard such as exposure monitoring, medical surveillance, and training.

##### II. Health Hazard Data

###### A. Ways in which lead enters your body.

When absorbed into your body in certain doses, lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed. Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion. A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

B. *Effects of overexposure to lead—(1) Short term (acute) overexposure.* Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

(2) *Long-term (chronic) overexposure.* Chronic overexposure to lead may result in severe damage to your blood-forming,



nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain. Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy. Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible. Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders or die during the first year of childhood. Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood.

(3) *Health protection goals of the standard.* Prevention of adverse health effects for most workers from exposure to lead throughout a working lifetime requires that a worker's blood lead level (BLL, also expressed as PbB) be maintained at or below forty micrograms per deciliter of whole blood (40 µg/dl). The blood lead levels of workers (both male and female workers) who intend to have children should be maintained below 30 µg/dl to minimize adverse reproductive health effects

to the parents and to the developing fetus. The measurement of your blood lead level (BLL) is the most useful indicator of the amount of lead being absorbed by your body. Blood lead levels are most often reported in units of milligrams (mg) or micrograms (µg) of lead (1 mg=1000 µg) per 100 grams (100g), 100 milliliters (100 ml) or deciliter (dl) of blood. These three units are essentially the same. Sometime BLLs are expressed in the form of mg% or µg%. This is a shorthand notation for 100g, 100 ml, or dl. (References to BLL measurements in this standard are expressed in the form of µg/dl.)

BLL measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues. BLL measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead-related diseases, however, has focused heavily on associations between BLLs and various diseases. As a result, your BLL is an important indicator of the likelihood that you will gradually acquire a lead-related health impairment or disease.

Once your blood lead level climbs above 40 µg/dl, your risk of disease increases. There is a wide variability of individual response to lead, thus it is difficult to say that a particular BLL in a given person will cause a particular effect. Studies have associated fatal encephalopathy with BLLs as low as 150 µg/dl. Other studies have shown other forms of diseases in some workers with BLLs well below 80 µg/dl. Your BLL is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated BLLs. The longer you have an elevated BLL, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage. The best way to prevent all forms of lead-related impairments and diseases—both short term and long term—is to maintain your BLL below 40 µg/dl. The provisions of the standard are designed with this end in mind.

Your employer has prime responsibility to assure that the provisions of the standard are complied with both by the company and by individual workers. You, as a worker, however, also have a responsibility to assist your employer in complying with the standard. You can play a key role in protecting your own health by learning about the lead hazards and their control, learning what the standard requires, following the standard where it governs your own actions, and seeing that your employer complies with provisions governing his or her actions.

(4) *Reporting signs and symptoms of health problems.* You should immediately notify your employer if you develop signs or symptoms associated with lead poisoning or if you desire medical advice concerning the effects of current or past exposure to lead or your ability to have a healthy child. You should also notify your employer if you have difficulty breathing during a respirator fit test or while wearing a respirator. In each of these

cases, your employer must make available to you appropriate medical examinations or consultations. These must be provided at no cost to you and at a reasonable time and place. The standard contains a procedure whereby you can obtain a second opinion by a physician of your choice if your employer selected the initial physician.

#### Appendix B to § 1926.62—Employee Standard Summary

This appendix summarizes key provisions of the interim final standard for lead in construction that you as a worker should become familiar with.

##### I. Permissible Exposure Limit (PEL)—Paragraph (C)

The standard sets a permissible exposure limit (PEL) of 50 micrograms of lead per cubic meter of air (50 µg/m<sup>3</sup>), averaged over an 8-hour workday which is referred to as a time-weighted average (TWA). This is the highest level of lead in air to which you may be permissibly exposed over an 8-hour workday. However, since this is an 8-hour average, short exposures above the PEL are permitted so long as for each 8-hour work day your average exposure does not exceed this level. This interim final standard, however, takes into account the fact that your daily exposure to lead can extend beyond a typical 8-hour workday as the result of overtime or other alterations in your work schedule. To deal with this situation, the standard contains a formula which reduces your permissible exposure when you are exposed more than 8 hours. For example, if you are exposed to lead for 10 hours a day, the maximum permitted average exposure would be 40 µg/m<sup>3</sup>.

##### II. Exposure Assessment—Paragraph (D)

If lead is present in your workplace in any quantity, your employer is required to make an initial determination of whether any employee's exposure to lead exceeds the action level (30 µg/m<sup>3</sup> averaged over an 8-hour day). Employee exposure is that exposure which would occur if the employee were not using a respirator. This initial determination requires your employer to monitor workers' exposures unless he or she has objective data which can demonstrate conclusively that no employee will be exposed to lead in excess of the action level. Where objective data is used in lieu of actual monitoring the employer must establish and maintain an accurate record, documenting its relevancy in assessing exposure levels for current job conditions. If such objective data is available, the employer need proceed no further on employee exposure assessment until such time that conditions have changed and the determination is no longer valid.

Objective data may be compiled from various sources, e.g., insurance companies and trade associations and information from suppliers or exposure data collected from similar operations. Objective data may also comprise previously-collected sampling data including area monitoring. If it cannot be determined through using objective data that worker exposure is less than the action level, your employer must conduct monitoring or must rely on relevant previous personal sampling, if available. Where monitoring is

should be separated from both the waste storage area and the contamination control area by physical curtains, doors, and/or airflow patterns that force any airborne contamination back into the work area.

See paragraph (j) of this section for requirements for hygiene facilities.

During egress from the work area, each worker should step into the equipment room, clean tools and equipment, and remove gross contamination from clothing by wet cleaning and HEPA vacuuming. Before entering the shower area, foot coverings, head coverings, hand coverings, and coveralls are removed and placed in impervious bags for disposal or cleaning. Airline connections from airline respirators with HEPA disconnects and power cables from powered air-purifying respirators (PAPRs) will be disconnected just prior to entering the shower room.

#### *Establishing Negative Pressure Within the Enclosure*

**Negative Pressure:** Air is to be drawn into the enclosure under all anticipated conditions and exhausted through a HEPA filter for 24 hours a day during the entire duration of the project.

**Air Flow Tests:** Air flow patterns will be checked before removal operations begin, at least once per operating shift and any time there is a question regarding the integrity of the enclosure. The primary test for air flow is to trace air currents with smoke tubes or other visual methods. Flow checks are made at each opening and at each doorway to demonstrate that air is being drawn into the enclosure and at each worker's position to show that air is being drawn away from the breathing zone.

**Monitoring Pressure Within the Enclosure:** After the initial air flow patterns have been checked, the static pressure must be monitored within the enclosure. Monitoring may be made using manometers, pressure gauges, or combinations of these devices. It is recommended that they be attached to alarms and strip chart recorders at points identified by the design engineer.

**Corrective Actions:** If the manometers or pressure gauges demonstrate a reduction in pressure differential below the required level, work should cease and the reason for the change investigated and appropriate changes made. The air flow patterns should be retested before work begins again.

**Pressure Differential:** The design parameters for static pressure differentials between the inside and outside of enclosures typically range from 0.02 to 0.10 inches of water gauge, depending on conditions. All zones inside the enclosure must have less pressure than the ambient pressure outside of the enclosure (-0.02 inches water gauge differential). Design specifications for the differential vary according to the size, configuration, and shape of the enclosure as well as ambient and mechanical air pressure conditions around the enclosure.

**Air Flow Patterns:** The flow of air past each worker shall be enhanced by positioning the intakes and exhaust ports to remove contaminated air from the worker's breathing zone, by positioning HEPA vacuum cleaners to draw air from the worker's breathing zone, by forcing relatively uncontaminated air past

the worker toward an exhaust port, or by using a combination of methods to reduce the worker's exposure.

**Air Handling Unit Exhaust:** The exhaust plume from air handling units should be located away from adjacent personnel and intakes for HVAC systems.

**Air Flow Volume:** The air flow volume (cubic meters per minute) exhausted (removed) from the workplace must exceed the amount of makeup air supplied to the enclosure. The rate of air exhausted from the enclosure should be designed to maintain a negative pressure in the enclosure and air movement past each worker. The volume of air flow removed from the enclosure should replace the volume of the container at every 5 to 15 minutes. Air flow volume will need to be relatively high for large enclosures, enclosures with awkward shapes, enclosures with multiple openings, and operations employing several workers in the enclosure.

**Air Flow Velocity:** At each opening, the air flow velocity must visibly "drag" air into the enclosure. The velocity of air flow within the enclosure must be adequate to remove airborne contamination from each worker's breathing zone without disturbing the asbestos-containing material on surfaces.

**Airlocks:** Airlocks are mechanisms on doors and curtains that control the air flow patterns in the doorways. If air flow occurs, the patterns through doorways must be such that the air flows toward the inside of the enclosure. Sometimes vestibules, double doors, or double curtains are used to prevent air movement through the doorways. To use a vestibule, a worker enters a chamber by opening the door or curtain and then closing the entry before opening the exit door or curtain.

Airlocks should be located between the equipment room and shower room, between the shower room and the clean room, and between the waste storage area and the outside of the enclosure. The air flow between adjacent rooms must be checked using smoke tubes or other visual tests to ensure the flow patterns draw air toward the work area without producing eddies.

#### *Monitoring for Airborne Concentrations*

In addition to the breathing zone samples taken as outlined in paragraph (f) of this section, samples of air should be taken to demonstrate the integrity of the enclosure, the cleanliness of the clean room and shower area, and the effectiveness of the HEPA filter. If the clean room is shown to be contaminated, the room must be relocated to an uncontaminated area.

Samples taken near the exhaust of portable ventilation systems must be done with care.

#### *General Work Practices*

Preventing dust dispersion is the primary means of controlling the spread of asbestos within the enclosure. Whenever practical, the point of removal should be isolated, enclosed, covered, or shielded from the workers in the area. Waste asbestos containing materials must be bagged during or immediately after removal; the material must remain saturated until the waste container is sealed.

Waste material with sharp points or corners must be placed in hard air-tight containers rather than bags.

Whenever possible, large components should be sealed in plastic sheeting and removed intact.

Bags or containers of waste will be moved to the waste holding area, washed, and wrapped in a bag with the appropriate labels.

#### *Cleaning the Work Area*

Surfaces within the work area should be kept free of visible dust and debris to the extent feasible. Whenever visible dust appears on surfaces, the surfaces within the enclosure must be cleaned by wiping with a wet sponge, brush, or cloth and then vacuumed with a HEPA vacuum.

All surfaces within the enclosure should be cleaned before the exhaust ventilation system is deactivated and the enclosure is disassembled. An approved encapsulate may be sprayed onto areas after the visible dust has been removed.

11. Appendix G to § 1926.1101 is removed and reserved.

12. Appendix H of § 1926.1101 is revised to read as follows:

#### **Appendix H to § 1915.1001—Substance Technical Information for Asbestos, Non-Mandatory**

##### *I. Substance Identification*

A. Substance: "Asbestos" is the name of a class of magnesium-silicate minerals that occur in fibrous form. Minerals that are included in this group are chrysotile, crocidolite, amosite, anthophyllite asbestos, tremolite asbestos, and actinolite asbestos.

B. Asbestos is and was used in the manufacture of heat-resistant clothing, automotive brake and clutch linings, and a variety of building materials including floor tiles, roofing felts, ceiling tiles, asbestos-cement pipe and sheet, and fire-resistant drywall. Asbestos is also present in pipe and boiler insulation materials and in sprayed-on materials located on beams, in crawlspaces, and between walls.

C. The potential for an asbestos-containing product to release breathable fibers depends largely on its degree of friability. Friable means that the material can be crumbled with hand pressure and is therefore likely to emit fibers. The fibrous fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable, and they readily release airborne fibers if disturbed. Materials such as vinyl-asbestos floor tile or roofing felt are considered non-friable if intact and generally do not emit airborne fibers unless subjected to sanding, sawing and other aggressive operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut or sawed, or if they are broken.

D. Permissible exposure: Exposure to airborne asbestos fibers may not exceed 0.1 fibers per cubic centimeter of air (0.1 f/cc) averaged over the 8-hour workday, and 1 fiber per cubic centimeter of air (1.0 f/cc) averaged over a 30 minute work period.





## II. Health Hazard Data

A. Asbestos can cause disabling respiratory disease and various types of cancers if the fibers are inhaled. Inhaling or ingesting fibers from contaminated clothing or skin can also result in these diseases. The symptoms of these diseases generally do not appear for 20 or more years after initial exposure.

B. Exposure to asbestos has been shown to cause lung cancer, mesothelioma, and cancer of the stomach and colon. Mesothelioma is a rare cancer of the thin membrane lining of the chest and abdomen. Symptoms of mesothelioma include shortness of breath, pain in the walls of the chest, and/or abdominal pain.

## III. Respirators and Protective Clothing

A. Respirators: You are required to wear a respirator when performing tasks that result in asbestos exposure that exceeds the permissible exposure limit (PEL) of 0.1 f/cc, and when performing certain designated operations. Air-purifying respirators equipped with a high-efficiency particulate air (HEPA) filter can be used where airborne asbestos fiber concentrations do not exceed 1.0 f/cc; otherwise, more protective respirators such as air-supplied, positive-pressure, full facepiece respirators must be used. Disposable respirators or dust masks are not permitted to be used for asbestos work. For effective protection, respirators must fit your face and head snugly. Your employer is required to conduct fit test when you are first assigned a respirator and every 6 months thereafter. Respirators should not be loosened or removed in work situations where their use is required.

B. Protective Clothing: You are required to wear protective clothing in work areas where asbestos fiber concentrations exceed the permissible exposure limit (PEL) of 0.1 f/cc.

## IV. Disposal Procedures and Clean-up

A. Wastes that are generated by processes where asbestos is present include:

1. Empty asbestos shipping containers.
2. Process wastes such as cuttings, trimmings, or reject materials.
3. Housekeeping waste from wet-sweeping or HEPA-vacuuming.
4. Asbestos fireproofing or insulating material that is removed from buildings.
5. Asbestos-containing building products removed during building renovation or demolition.
6. Contaminated disposable protective clothing.

B. Empty shipping bags can be flattened under exhaust hoods and packed into airtight containers for disposal. Empty shipping drums are difficult to clean and should be sealed.

C. Vacuum bags or disposable paper filters should not be cleaned, but should be sprayed with a fine water mist and placed into a labeled waste container.

D. Process waste and housekeeping waste should be wetted with water or a mixture of water and surfactant prior to packaging in disposable containers.

E. Asbestos-containing material that is removed from buildings must be disposed of in leak-tight 6-mil plastic bags, plastic-lined cardboard containers, or plastic-lined metal

containers. These wastes which are removed while wet, should be sealed in containers before they dry out to minimize the release of asbestos fibers during handling.

## V. Access to Information

A. Each year, your employer is required to inform you of the information contained in this standard and appendices for asbestos. In addition, your employer must instruct you in the proper work practices for handling asbestos-containing materials, and the correct use of protective equipment.

B. Your employer is required to determine whether you are being exposed to asbestos. Your employer must treat exposure to thermal system insulation and sprayed-on and trowled-on surfacing material as asbestos exposure, unless results of laboratory analysis show that the material does not contain asbestos. You or your representative has the right to observe employee measurements and to record the results obtained. Your employer is required to inform you of your exposure, and, if you are exposed above the permissible exposure limit, he or she is required to inform you of the actions that are being taken to reduce your exposure to within the permissible limit.

C. Your employer is required to keep records of your exposures and medical examinations. These exposure records must be kept for at least thirty (30) years. Medical records must be kept for the period of your employment plus thirty (30) years.

D. Your employer is required to release your exposure and medical records to your physician or designated representative upon your written request.

## Appendix I of 1926.1101 [Amended]

13. Appendix I of § 1926.1101 is amended by revising the first sentence of the second paragraph of section IV, entitled Surveillance and Preventive Consideration to read as follows:

The employer is required to institute a medical surveillance program for all employees who are or will be exposed to asbestos at or above the permissible exposure limit (0.1 fiber per cubic centimeter of air).

14. Appendix K to § 1926.1101 is added to read as follows:

## Appendix K to § 1926.1101—Polarized Light Microscopy of Asbestos (Non-Mandatory)

Method number:

ID-491

Matrix: Bulk

Collection Procedure:

Collect approximately 1 to 2 grams of each type of material and place into separate 20 mL scintillation vials.

Analytical Procedure:

A portion of each separate phase is analyzed by gross examination, phase-polar examination, and central stop dispersion microscopy.

Commercial manufacturers and products mentioned in this method are for descriptive use only and do not constitute endorsements by USDOL-OSHA. Similar products from other sources may be substituted.

## 1. Introduction

This method describes the collection and analysis of asbestos bulk materials by light microscopy techniques including phase-polar illumination and central-stop dispersion microscopy. Some terms unique to asbestos analysis are defined below:

**Amphibole:** A family of minerals whose crystals are formed by long, thin units which have two thin ribbons of double chain silicates with a brucite ribbon in between. The shape of each unit is similar to an "I beam". Minerals important in asbestos analysis include cummingtonite-grunerite, crocidolite, tremolite-actinolite and anthophyllite.

**Asbestos:** A term for naturally occurring fibrous minerals. Asbestos includes chrysotile, cummingtonite-grunerite asbestos (amosite), anthophyllite asbestos, tremolite asbestos, crocidolite, actinolite asbestos and any of these minerals which have been chemically treated or altered. The precise chemical formulation of each species varies with the location from which it was mined. Nominal compositions are listed:

Chrysotile  $Mg_3Si_2O_5(OH)_4$   
Crocidolite (Riebeckite asbestos)  $Na_2Fe_3^{2+}Fe^{3+}_2Si_8O_{22}(OH)_2$   
Cummingtonite-Grunerite asbestos (Amosite)  $(Mg,Fe)_7Si_8O_{22}(OH)_2$   
Tremolite-Actinolite asbestos  $Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$   
Anthophyllite asbestos  $(Mg,Fe)_7Si_8O_{22}(OH)_2$

**Asbestos Fiber:** A fiber of asbestos meeting the criteria for a fiber. (See section 3.5. of this Appendix)

**Aspect Ratio:** The ratio of the length of a fiber to its diameter usually defined as "length" ÷ "width", e.g. 3:1.

**Brucite:** A sheet mineral with the composition  $Mg(OH)_2$ .

**Central Stop Dispersion Staining (microscope):** This is a dark field microscope technique that images particles using only light refracted by the particle, excluding light that travels through the particle unrefracted. This is usually accomplished with a McRae objective or other arrangement which places a circular stop with apparent aperture equal to the objective aperture in the back focal plane of the microscope.

**Cleavage Fragments:** Mineral particles formed by the comminution of minerals, especially those characterized by relatively parallel sides and moderate aspect ratio.

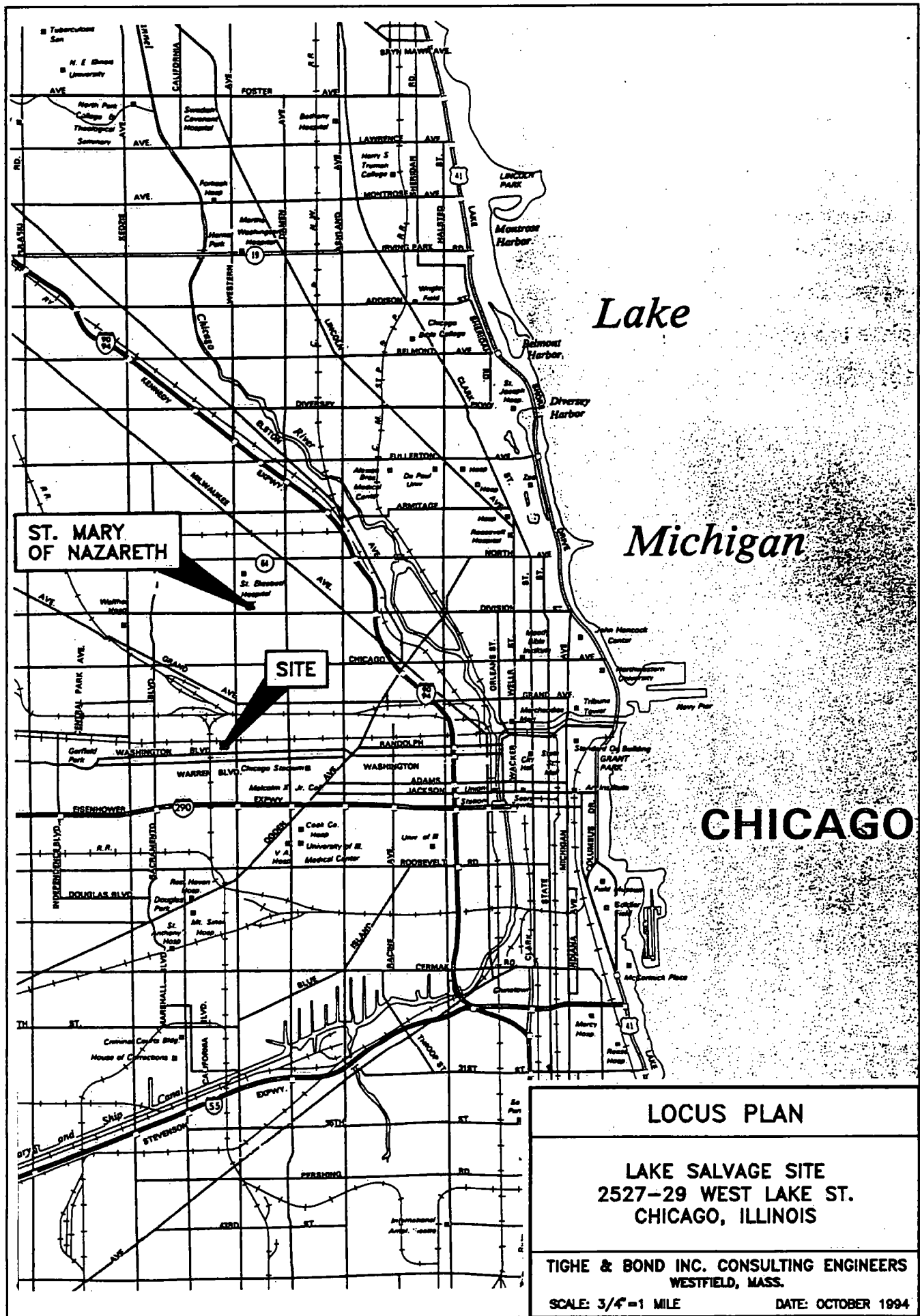
**Differential Counting:** The term applied to the practice of excluding certain kinds of fibers from a phase contrast asbestos count because they are not asbestos.

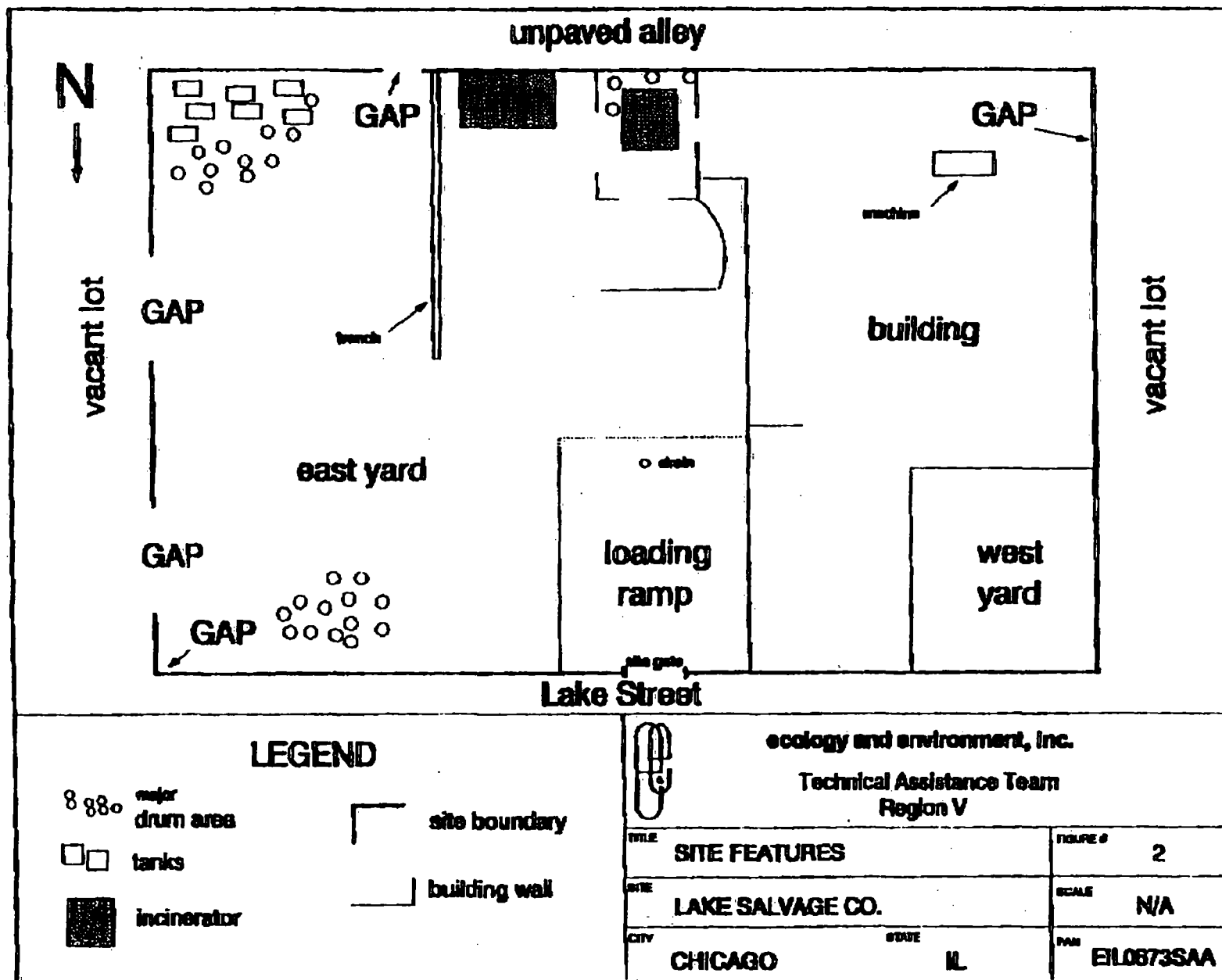
**Fiber:** A particle longer than or equal to 5  $\mu$ m with a length to width ratio greater than or equal to 3:1. This may include cleavage fragments. (see section 3.5 of this appendix).

**Phase Contrast:** Contrast obtained in the microscope by causing light scattered by small particles to destructively interfere with unscattered light, thereby enhancing the visibility of very small particles and particles with very low intrinsic contrast.

**APPENDIX C**

**Site Map**





**APPENDIX B**

**Analytical Data**

\*\*\*\*\*  
 \*TWIN CITY TESTING CORPORATION\*  
 \*METHOD 8290 ANALYSIS RESULTS\*  
 \*\*\*\*\*  
 Client....ECOLOGY & ENVIRONMENT

Client's Sample ID.....L581 (1:5 DILUTION)  
 TCT Sample ID.....17688  
 Analysis Date.....4/8/94 21:23  
 Filename.....840406M  
 Injected By.....KCH  
 Total Amount Extracted...0.0114 kg  
 % Moisture.....1.4 %  
 ICAL Date.....12/10/93  
 CCAL Filename.....840406I  
 Method Blank ID.....BLANK-17'18  
 Extraction Date.....4/1/94

**DRAFT**

NATIVE ISOMERS	CONC. ng/kg	LOD ng/kg	INTERNAL STANDARD	FW'S ADDED	PERCENT RECOVERY
2378-TCDF	760	-----	2378-TCDF-13C....	2.00	101
TOTAL TCDF	4000	-----	2378-TCDF-13C....	2.00	33
* 2378-TCDD	13	-----	2378-TCDD-13C....	2.00	109
TOTAL TCDD	180	-----	2378-TCDD-13C....	2.00	110
12378-PeCDF	880	-----	12378-PeCDF-13C....	2.00	103
23478-PeCDF	860	-----	23478-PeCDF-13C....	2.00	105
TOTAL PeCDF	5400	-----	23478-PeCDF-13C....	2.00	95
12378-PeCDD	58	-----	12378-PeCDD-13C....	2.00	103
TOTAL PeCDD	580	-----	12378-PeCDD-13C....	2.00	93
123478-HxCDF	2600	-----	123478-HxCDF-13C....	2.00	92
123678-HxCDF	1100	-----	123678-HxCDF-13C....	2.00	101
234678-HxCDF	720	-----	234678-HxCDF-13C....	2.00	104
123789-HxCDF	810	-----	123789-HxCDF-13C....	2.00	95
TOTAL HxCDF	7200	-----	123789-HxCDF-13C....	2.00	103
123478-HxCDD	76	-----	123478-HxCDD-13C....	2.00	NA
123678-HxCDD	160	-----	123678-HxCDD-13C....	2.00	NA
123789-HxCDD	110	-----	123789-HxCDD-13C....	2.00	71
TOTAL HxCDD	1400	-----	123789-HxCDD-13C....	2.00	
1234678-HpCDF	4300	-----	1234678-HpCDF-13C....	2.00	
1234789-HpCDF	1300	-----	1234789-HpCDF-13C....	2.00	
TOTAL HpCDF	8300	-----	1234789-HpCDF-13C....	2.00	
1234678-HpCDD	1500	-----	1234678-HpCDD-13C....	2.00	
TOTAL HpCDD	2600	-----	1234678-HpCDD-13C....	2.00	
OCDF	9200	-----	OCDF-13C.....	2.00	
OCDD	3100	-----	OCDD-13C.....	2.00	

Total 2378-TCDD  
 Equivalency: 1053 ng/kg  
 (Using ITC Factors)

\* Value obtained from confirmation runfile 840406D.

All values are expressed on a dry weight basis.

CONC= Concentration (Totals include 2378-substituted isomers.)

LOD = Limit of Detection

ND = Not Detected

NA = Not Applicable

TCT Invoice Number....4411 94-3226

OPTIONAL FORM 98 (7-90)

FAX TRANSMITTAL

TO: Patrick Kemper  
 Dept (Agency)  
 Cotton Industries  
 FAX #  
 201/455-0306

FROM: FRED BARTMAN  
 312-386-0777  
 312-355-91

NSN 7540-01-317-7368

5099 101

GENERAL SERVICES ADMINISTRATION

\*\*\*\*\*  
 \*TWIN CITY TESTING CORPORATION\*  
 \*METHOD 8290 ANALYSIS RESULTS\*  
 \*\*\*\*\*  
 Client....ECOLOGY & ENVIRONMENT

Client's Sample ID.....1552 (1:20 DILUTION)  
 TCT Sample ID.....17687  
 Analysis Date.....4/6/94 23:08  
 Filename.....S404060  
 Injected By.....NCH  
 Total Amount Extracted...0.0127 kg  
 % Moisture.....10.1 %  
 ICAI Date.....12/10/93  
 CCAL Filename.....S404061  
 Method Blank ID.....BLANK-17718  
 Extraction Date.....4/1/94

**DRAFT**

NATIVE ISOMERS	CONC. ng/kg	LOD ng/kg	INTERNAL STANDARD	WT'S ADDED	PERCENT RECOVERY
2378-TCDF	14000 *	-----	2378-TCDF-13C....	2.00	129
TOTAL TCDF	74000	-----	2378-TCDD-13C....	2.00	103
2378-TCDD	300	-----	12378-PeCDF-13C..	2.00	137
TOTAL TCDD	4800	-----	23473-PeCDF-13C..	2.00	143
12378-PeCDF	31000	-----	12378-PeCDD-13C..	2.00	124
23478-PeCDF	13000	-----	12347H-HxCDF-13C.	2.00	125
TOTAL PeCDF	120000	-----	12347H-HxCDF-13C.	2.00	108
12378-PeCDD	1100	-----	23467H-HxCDF-13C.	2.00	120
TOTAL PeCDD	11000	-----	12378H-HxCDF-13C.	2.00	128
123478-HxCDF	73000	-----	12347H-HxCDD-13C.	2.00	100
123678-HxCDF	23000	-----	12367H-HxCDD-13C.	2.00	101
234678-HxCDF	15000	-----	12346H-HpCDF-13C.	2.00	126
123789-HxCDF	13000	-----	12347H-HpCDF-13C.	2.00	129
TOTAL HxCDF	200000	-----	12346H-HpCDD-13C.	2.00	114
123478-HxCDD	2300	-----	OCDD-13C.....	2.00	115
123678-HxCDD	3400	-----			
123789-HxCDD	2500	-----			
TOTAL HxCDD	29000	-----			
1234678-HpCDF	120000	-----	1234-TCDD-13C....	2.00	NA
1234789-HpCDF	39000	-----	12378H-HxCDD-13C.	2.00	NA
TOTAL HpCDF	200000	-----			
1234678-HpCDD	30000	-----			
TOTAL HpCDD	49000	-----			
OCDF	600000 **	-----			
OCDD	74000	-----			

Total 2378-TCDD  
 Equivalance: 25084 ng/kg  
 (Using ITE Factors)

\* Value obtained from confirmation runfile S404062.  
 \*\*Saturated signal.  
 All values are expressed on a dry weight basis.

CONC= Concentration (Totals include 2378-substituted isomers.)  
 LOD = Limit of Detection  
 ND = Not Detected  
 NA = Not Applicable

TCT Invoice Number....4411 94-3226

\*\*\*\*\*  
 \*TWIN CITY TESTING CORPORATION\*  
 \*METHOD 8290 ANALYSIS RESULTS\*  
 \*\*\*\*\*  
 Client....ECOLOGY & ENVIRONMENT

Client's Sample ID.....LMS3 (1:5 DILUTION)  
 TCT Sample ID.....17688  
 Analysis Date.....4/5/94 23:13  
 Filename.....840406N  
 Injected By.....MCH  
 Total Amount Extracted...0.0142 kg  
 & Moisture.....19.9 %  
 ICAL Date.....12/10/93  
 CCAL Filename.....840406I  
 Method Blank ID.....BLANK-17718  
 Extraction Date.....4/1/94

**DRAFT**

NATIVE ISOMERS	CONC. ng/kg	LOD ng/kg	INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF	1700 *	-----	2378-TCDF-13C....	2.00	117
TOTAL TCDF	9000	-----	2378-TCDD-13C....	2.00	102
2378-TCDD	16	-----	12378-PeCDF-13C..	2.00	108
TOTAL TCDD	500	-----	12378-PeCDD-13C..	2.00	110
12378-PeCDF	3000	-----	123478-HxCDF-13C..	2.00	106
23478-PeCDF	740	-----	123678-HxCDF-13C..	2.00	106
TOTAL PeCDF	8700	-----	123478-HxCDD-13C..	2.00	95
12378-PeCDD	73	-----	123678-HxCDD-13C..	2.00	111
TOTAL PeCDD	860	-----	123478-HxCDD-13C..	2.00	121
123478-HxCDF	5900	-----	123678-HxCDD-13C..	2.00	91
123678-HxCDF	1700	-----	1234678-HpCDF-13C	2.00	84
234678-HxCDF	890	-----	1234678-HpCDD-13C	2.00	106
123789-HxCDF	860	-----	123478-HpCDF-13C	2.00	109
TOTAL HxCDF	12000	-----	1234678-HpCDD-13C	2.00	95
123478-HxCDD	95	-----	OCDD-13C.....	4.00	96
123678-HxCDD	190	-----			
123789-HxCDD	130	-----	1234-TCDD-13C....	2.00	NA
TOTAL HxCDD	1900	-----	123789-HxCDD-13C..	2.00	NA
1234678-HpCDF	5900	-----	2378-TCDD-37C14..	0.20	105
1234789-HpCDF	2300	-----			
TOTAL HpCDF	11000	-----			
1234678-HpCDD	5200	-----			
TOTAL HpCDD	12000	-----			
OCDF	22000	-----			
OCDD	61000	-----			

Total 2378-TCDD  
 Equivalence: 1896 ng/kg  
 (Using ITE Factors/DB-5 Data)

\* Value obtained from confirmation runfile 840406F.

All values are expressed on a dry weight basis.

CONC= Concentration (Totals include 2378-substituted isomers.)

LOD = Limit of Detection

ND = Not Detected

NA = Not Applicable

TCT Invoice Number....4411 94-3226



SEP 8'94 17:21 FR LITTON REAL ESTATE 201 455 0306 TO ARLINGTON

P.02



QUALITY  
ANALYTICAL  
LABS, INC.

**Final Report**

May 16, 1994

Litton Industries, Inc.  
1 Gatehall Drive  
Parsippany, New Jersey 07054-4514

ATTN: Patrick J. Hapner  
Environmental Affairs

Chain of Custody #: 5-22886 (E & E)  
Project Name & #: T05-9404-022; Proj.#EIL0673FAA  
Sampling Date: 04/21/94

Please find enclosed the Analytical Report for the following samples:

QAL Lab IDSample Description

940866-01

LID1 &amp; LID1A Composite ash/soil

**FINAL REPORT**

Please note that the following tests were done as part of a subcontract agreement with an outside laboratory:  
Dioxins & Herbicides

PCB's analysis quanted as Aroclor 1254. Aroclors 1248 & 1260 also present.

If you have any questions please contact Mike Kimmel at our laboratories.

Respectfully submitted,

Quality Analytical Laboratories, Inc.

*Mike Kimmel (for)*  
John Boudreau  
Laboratory Director

sy:LI940866

**RECEIVED**

MAY 11 1994

**REAL ESTATE DEPT.**

\_\_\_\_\_  
"Precision, Accuracy and Service"

Quality Analytical Laboratories, Inc. Project #940866  
Page 2 of 5

Sample ID: LIDA & LIDIA, Composite ash/soil 940866-01

TCLP Extraction Date: 04/26/94

Analysis Date: 04/28/94

**TCLP VOLATILES**

Method: SW-846 8260

Parameter	PQL (mg/L)	Analysis (mg/L)
Benzene	0.05	U
Carbon tetrachloride	0.05	U
Chlorobenzene	0.05	U
Chloroform	0.05	U
1,2-Dichloroethane	0.05	U
1,1-Dichloroethylene	0.05	U
Methyl ethyl ketone	2.5	U
Tetrachloroethylene	0.05	U
Trichloroethylene	0.05	U
Vinyl chloride	0.05	U

TCLP Extraction Date: 04/26/94

Extraction Date: 04/27/94

Analysis Date: 05/03/94

**TCLP SEMI-VOLATILES**

Method: SW-846 8270

Parameter	PQL (ug/L)	Analysis (ug/L)
Pyridine	50.	U
1,4-Dichlorobenzene	50.	U
2-Methylphenol	50.	U
3 & 4-Methylphenol	50.	U
Hexachloroethane	50.	U
Nitrobenzene	50.	U
Hexachlorobutadiene	50.	U
2,4,6-Trichlorophenol	50.	U
2,4,5-Trichlorophenol	50.	U
2,4-Dinitrotoluene	50.	U
Hexachlorobenzene	50.	U
Pentachlorophenol	250.	U

TCLP Extraction Date: 04/26/94

Digestion Date: 04/27/94

**TCLP RCRA METALS**

Parameter	PQL mg/L	Analysis mg/L	Method SW846-	Analysis Date
Arsenic	0.10	U	6010	04/28/94
Cadmium	0.005	0.36	6010	04/28/94
Chromium	0.015	U	6010	04/28/94
Lead	0.10	62.	6010	04/28/94
Selenium	0.20	U	6010	04/28/94
Silver	0.010	U	6010	04/27/94
Barium	0.30	1.3	6010	04/28/94
Mercury	0.0005	0.0059	7470	05/02/94

Quality Analytical Laboratories, Inc. Project #940866  
Page 5 of 5

Sample ID: LIDA & LID1A, Composite ash/soil 940866-01 (cont'd)

**Qualifiers for Dioxins**

- B = Analyte found in associated laboratory method blank.
- C = Co-eluting isomer present.
- E = Estimate only. Exceeds instrument calibration range.
- I = Possible Polychlorinated Diphenyl ether interference.
- J = Estimate only. Below instrument calibration range.
- NA = Not analyzed.
- NR = Not reportable.
- Q = Peak(s) present outside ion ratio limits.
- S = Possible ion suppression indicated by PFK mass intensity.
- U = Not detected at the level reported.
- X = Defined separately (see Case Narrative).

Quality Analytical Laboratories, Inc. Project #940866  
Page 4 of 5

Sample ID: LIDA & LID1A, Composite ash/soil 940866-01 (cont'd)  
Extraction Date: 04/28/94  
Analysis Date: 05/12/94, 2,3,7,8-TCDD/TCDF  
Analysis Date: 05/03/94, Totals

**DIOXIN RESULTS**

Parameter

Method: 8290

Analysis

pg/g

Dioxin

Qualifiers

2,3,7,8-TCDD	206.	
2,3,7,8-TCDF	14,300	C,E
Total TCDD	8,580	S
1,2,3,7,8-PeCDD	968.	
Total PeCDD	16,700	
1,2,3,4,7,8-HxCDD	1,870	
1,2,3,6,7,8-HxCDD	3,440	
1,2,3,7,8,9-HxCDD	5,250	
Total HxCDD	40,100	
1,2,3,4,6,7,8-HpCDD	30,900	B,E
Total HpCDD	57,500	B,E
OCDD	57,900	B,E
Total TCDF	84,600	E,I,S
1,2,3,7,8-PeCDF	22,100	E
2,3,4,7,8-PeCDF	12,200	
Total PeCDF	133,000	E,I
1,2,3,4,7,8-HxCDF	65,500	C,E
1,2,3,6,7,8-HxCDF	16,400	
2,3,4,6,7,8-HxCDF	13,700	B
1,2,3,7,8,9-HxCDF	2,150	
Total-HxCDF	156,000	B,E,I
1,2,3,4,6,7,8-HpCDF	66,000	B,E
1,2,3,4,7,8,9-HpCDF	22,200	E
Total-HpCDF	118,000	B,E
OCDF	96,400	B,E

Quality Analytical Laboratories, Inc. Project #940866  
Page 3 of 5

Sample ID: LIDA & LID1A. Composite ash/soil 940866-01 (cont'd)

Final result.

Extraction Date: 04/28/94 Analysis Date: 05/05/94

%Moisture: 16

PCBs Analysis

Method: SW846 8080

Dry Weight

Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
Aroclor 1016	0.083	U
Aroclor 1221	0.083	U
Aroclor 1232	0.083	U
Aroclor 1242	0.083	U
Aroclor 1248	0.083	U
Aroclor 1254	0.083	16.
Aroclor 1260	0.083	U

TCLP Extraction Date: 04/26/94

Extraction Date: 04/28/94 Analysis Date: 05/04/94

TCLP PESTICIDES

Method: SW-846 8080

Parameter	CRDL (mg/L)	Analysis (mg/L)
Chlordane	0.03	U
Endrin	0.02	U
Heptachlor	0.008	U
Methoxychlor	0.4	U
Toxaphene	10.	U
Lindane	0.5	U
Heptachlor Epoxide	0.008	U

TCLP Extraction Date: 04/26/94

Extraction Date: 05/03/94 Analysis Date: 05/06/94

TCLP HERBICIDES

Method: SW-846 8150

Parameter	PQL (mg/L)	Analysis (mg/L)
2,4-D	0.020	U
2,4-5-TP (Silvex)	0.005	U

Parameter	PQL mg/Kg	Analysis mg/Kg	Method	Analysis Date
Cyanide, Total	0.62	U	SW846 9010	05/03/94
Sulfide, Total	1.2	U	9030	05/04/94
Sulfide, Reactive	1.2	U	7.3.4.2.	05/04/94
Flashpoint, Open-Cup		>200°F	ASTM D92- 90 mod.	05/02/94
pH (10% solution)		8.5	9045	04/26/94

## EPA - Defined Data Qualifiers

- B** Compound detected in blank (Normalized concentration)  
Used when blank value exceeds half of the CRDL (PQL).
- C** Pesticide result confirmed by GC/MSD
- D** Compound identified in analysis at a secondary dilution factor  
Used when two or more dilutions of a sample are needed to acquire valid data.
- E** Compound's concentration exceeds calibration range  
Used when upper level of calibration curve is exceeded by 10%. Analyses greater than 50% of upper calibration level are reanalyzed at a higher dilution.
- J** Estimated value. Compound detected below the CRDL (PQL).
- P** Pesticide or Aroclor analysis where results between analytical and confirmation columns is > 25%.
- U** Compound analyzed for but not detected at or above the CRDL (PQL).
- X** *NON-Specific flag - See definition at the end of the report*

## Data Validation Qualifiers

- NJ** Presumptive evidence of presence of material at an estimated quantity.  
Used when QA/QC failures are present AND data is true. Must be accompanied by NCR
- PND** Precision Not Determined  
Used when non-approved methods are used to obtain data.
- R** Reported value is unusable due to gross QA/QC deficiencies.
- RND** Recovery Not Determined  
Used when non-approved methods are used to obtain data.
- UJ** Compound analyzed for but not detected, reported detection limit estimated because QA/QC criteria were not met.

## Detection Limit Definitions

- CRDL** Contract Required Detection Limits = Detection limits specified by client or agency  
Based on wet weight analysis
- IDL** Instrument Detection Limit  
Statistically derived detection limit from 7 + analyses of a low level standard near but above the estimated Method Detection Limit.
- MDL** Method Detection Limit  
Instrument Detection Limit X End Volume (specified by the method) / Mass, Volume or Area of the Sample (specified by the method) (Based on wet weight analysis)
- PQL** Practical Quantitation Limit  
Method Detection Limit X End Volume (analytical) / Mass, Volume or Area of the Sample (analytical) (Based on wet weight analysis)

SEP 8'94 17:23 FR LITTON REAL ESTATE 201 455 0306 TO ARLINGTON P.08

\*\*\* TOTAL PAGE.003 \*\*\*

940856

Distribution: White - Accompanies Shipment; Pink - Coordinator Field Files; Yellow - Laboratory File

Table 4-1  
RESULTS OF CHEMICAL ANALYSIS OF  
FIR-COLLECTED SOIL SAMPLES

Sample Collection Information and Parameters	Sample Number						
	S1	S2	S3	D1	D2	D3	D4
Date	7/11/90	7/11/90	7/11/90	7/11/90	7/11/90	7/11/90	7/11/90
Time	1500	1200	1240	1100	1215	1240	1500
SAS Number	-	-	-	5537E-01	5537E-02	5537E-03	5537E-04
CLP Organic Traffic Report Number	ELD63	ELD64	ELD65	-	-	-	-
CLP Inorganic Traffic Report Number	MELP95	MELP96	MELP97	-	-	-	-
<u>Compound Detected</u> (values in µg/kg)							
<u>Semivolatile Organics</u>							
2-methylnaphthalene	--	--	110J	-	-	-	-
hexachlorobenzene	--	--	970J	-	-	-	-
phenanthrene	510J	--	1,700	-	-	-	-
anthracene	89J	--	370J	-	-	-	-
di-n-butylphthalate	120J	--	180J	-	-	-	-
fluoranthene	940	--	1,100	-	-	-	-
pyrene	820	--	2,900	-	-	-	-
benzo[a]anthracene	420J	--	1,800	-	-	-	-
chrysene	560J	--	2,200	-	-	-	-
bis(2-ethylhexyl)phthalate	570J	870J	1,200	-	-	-	-
benzo[b]fluoranthene	520J	--	3,000	-	-	-	-
benzo[k]fluoranthene	150J	--	1,400	-	-	-	-
benzo[e]pyrene	430J	--	1,700	-	-	-	-
indeno[1,2,3-cd]pyrene	210J	--	420J	-	-	-	-
dibenzo[a,h]anthracene	220J	--	170J	-	-	-	-
benzo[g,h,i]perylene	--	--	--	-	-	-	-
<u>Pesticides/PCBs</u>							
4,4'-DDE	260	--	--	-	-	-	-
Endosulfan II	-	--	490J	-	-	-	-
4,4'-DDD	54	--	--	-	-	-	-

4-2



Sample Collection Information  
and Parameters

## Sample Number

	S1	S2	S3	D1	D2	D3	D4
4,4'-DDT	440J	---	270J	-	-	-	-
Aroclor 1248	---	---	4,400J	-	-	-	-
Aroclor 1254	---	---	5,200J	-	-	-	-

Dioxin Detected(values in ng/kg)

1,2,3,4-TCDF	-	-	-	---	158.5	---	---
total tetra-CDD	-	-	-	---	1,475.3	---	---
total penta-CDD	-	-	-	---	595.3	412.5J	---
total hexa-CDD	-	-	-	162.7	3,096.9	1,423J	---
total hepta-CDD	-	-	-	563	12,698	16,520J	127
total octa-CDD	-	-	-	982	23,278	56,420J	407
1,2,3,7,8-TCDF	-	-	-	708.1	2,474.3	78,096J	21
total tetra-CDF	-	-	-	1,866.4	8,733.4	158,161J	42.4
total penta-CDF	-	-	-	2,713.3	16,144.6	522,674.2J	89.9
total hexa-CDF	-	-	-	3,847.2	24,553.9	361,314.7J	59.7
total hepta-CDF	-	-	-	3,273	24,248	387,270J	504
total octa-CDF	-	-	-	5,702	40,341	579,337J	60

Analyte Detected(values in ng/kg)

aluminum	14,080	2,070	12,800	-	-	-	-
antimony	---	17.3MJ	55.6MJ	-	-	-	-
arsenic	16.2	---	16.98	-	-	-	-
barium	114	52.8	556	-	-	-	-
beryllium	1.3	---	0.778	-	-	-	-
cadmium	2.4	1.28	17.8	-	-	-	-
calcium	16,800*J	3,750*J	5,930*J	-	-	-	-
chromium	28.9	10.8	225	-	-	-	-
cobalt	33	150	128	-	-	-	-
copper	266*J	907*J	12,500*J	-	-	-	-
iron	25,400	---	109,000*	-	-	-	-
lead	253M	433MJ	7,550M2	-	-	-	-

A

Table 4-1 (Cont.)

Sample Collection Information and Parameters	Sample Number						
	S1	S2	S3	D1	D2	D3	D4
magnesium	10,800*J	6568*J	2,100*J	-	-	-	-
manganese	355M	179MJ	353MJ	-	-	-	-
mercury	0.32	—	0.75	-	-	-	-
nickel	33.1	4.4B	122	-	-	-	-
potassium	2,790	693B	425B	-	-	-	-
selenium	1B	0.588MJ	2.7	-	-	-	-
sodium	150B	574B	235B	-	-	-	-
thallium	0.578MJ	—	—	-	-	-	-
vanadium	36.1	3.1B	34.3	-	-	-	-
zinc	230M	960MJ	2,350MJ	-	-	-	-

- Not applicable.

— Not detected.

NOTE: The VOA portions of the PAS samples were rejected because the sample holding times were exceeded at the laboratory. The VOA results, therefore, are not presented in this report.

Lake Salvage Sample # LSWPZ

Collection Date

294 P03

MAY 28 '94 12:49

3/31/94

Compound(s)	TEF	CONCENTRATION	=
2,3,7,8-TCDD	1.00	X ND	= 0
1,2,3,7,8-PeCDB	0.50	X ND	= 0
1,2,3,6,7,8-HxCDD	0.1	X 0.33	= .033
1,2,3,7,8,9-HxCDD	0.1	X 0.36	= .036
1,2,3,4,7,8-HxCDD	0.1	X 0.15	= .015
1,2,3,4,6,7,8-HpCDD	0.01	X 2.13	= .0213
OCDD	0.001	X 5.05	= .00505
* Total - TCDD	0.0		
* Total - PeCDB	0.0		
* Total - HxCDD	0.0		
* Total - HpCDD	0.0		
		SUBTOTAL	= .110
2,3,7,8-TCDF	0.10	X 4.33	= .0433
1,2,3,7,8-PeCDF	0.05	X 6.96	= .348
2,3,4,7,8-PeCDF	0.5	X 2.44	= 1.22
1,2,3,4,7,8-HxCDF	0.1	X 5.07	= .507
1,2,3,7,8,9-HxCDF	0.1	X 1.12	= .112
1,2,3,4,7,8-HxCDF	0.1	X 20.24	= 2.024
2,3,4,6,7,8-HxCDF	0.1	X 2.33	= .233
1,2,3,4,6,7,8-HpCDF	0.01	X 21.35	= .2135
1,2,3,4,7,8,9-HpCDF	0.01	X 6.98	= .0698
OCDF	0.001	X 46.96	= .04696
* Total - TCDF	0.0		
* Total - PeCDF	0.0		
* Total - HxCDF	0.0		
* Total - HpCDF	0.0		
		SUBTOTAL	= 4.682
		TOTAL	
		DIOXIN TE	= <span style="border: 1px solid black; padding: 2px;">1.792</span> pg/c.m <sup>2</sup>

294 P02

MAY 28 '94 12:49

Lake  
Salvage Sample # LSWP1 Collection Date 3/31/94

Compound(s)	TEP	X CONCENTRATION	=	
2,3,7,8-TCDD	1.00	X 0.17	=	0.17
1,2,3,7,8-PeCDD	0.50	X 0.76	=	0.38
1,2,3,6,7,8-HxCDD	0.1	X 1.70	=	.17
1,2,3,7,8,9-HxCDD	0.1	X 2.12	=	.212
1,2,3,4,7,8-HxCDD	0.1	X 0.85	=	.085
1,2,3,4,6,7,8-HpCDD	0.01	X 13.03	=	.1303
OCDD	0.001	X 34.93	=	.03493
* Total - TCDD	0.0			
* Total - PeCDD	0.0			
* Total - HxCDD	0.0			
* Total - HpCDD	0.0			
		SUB TOTAL	=	1.129
2,3,7,8-TCDF	0.10	X 23.88	=	2.388
1,2,3,7,8-PeCDF	0.05	X 29.35	=	1.4675
2,3,4,7,8-PeCDF	0.5	X 10.77	=	5.385
1,2,3,6,7,8-HxCDF	0.1	X 16.75	=	1.675
1,2,3,7,8,9-HxCDF	0.1	X 2.63	=	.263
1,2,3,4,7,8-HxCDF	0.1	X 55.25	=	5.525
1,2,3,4,6,7,8-HpCDF	0.1	X 11.96	=	1.196
2,3,4,6,7,8-HpCDF	0.01	X 61.23	=	.6123
1,2,3,4,6,7,8-HpCDF	0.01	X 16.16	=	.1616
OCDF	0.001	X 112.00	=	.112
* Total - TCDF	0.0			
* Total - PeCDF	0.0			
* Total - HxCDF	0.0			
* Total - HpCDF	0.0			
		SUBTOTAL	=	18.438
		TOTAL		
		DIOXIN TC	=	19.567 pg/cm <sup>2</sup>

**APPENDIX C**

**Sampling Procedures**

## SAMPLING LOCATION DETERMINATION

Potentially contaminated and background samples collection locations shall be determined utilizing the following procedure:

- a. Previously identified areas (i.e., incinerators) shall be considered one uniform area.
- b. For rectangular or square surfaces, set up cartesian coordinates for uniform area by establishing two base lines at right angles to each other which intersect at an arbitrarily selected origin. The baselines are denoted as the "x" and "y" or "r" axes. Each baseline should extend far enough for all of the uniform area to fall within the quadrant. The baseline will be the same for each sampling event.

For circular surfaces, set up polar coordinates for uniform area by establishing baseline radii which originates at the circle center and extends to the circle's periphery. This baseline is denoted as the "x" axis and the arch angle is denoted as "r". The baseline will be the same for each sampling event.

- c. Establish a scale interval along base line. The units of this scale shall be feet.
- d. Draw a random number from a random number table (usually available in any basic statistics book). Use this number to locate a point along the base line as follows. Multiply the first random number by the maximum 'x' dimension of the uniform sampling area to obtain the "x" coordinate of the first sampling point. Then multiply the next random number by the maximum "y" or "r" dimension of the uniform sampling area to obtain the "y" or "r" coordinate of the first sampling point.
- e. Locate the intersection of two lines drawn perpendicular to the base line through this point. This intersection represents one randomly selected location for collection of one concrete surface/soil sample. If this location at the intersection is outside the uniform area, disregard and repeat the above procedure.
- f. Repeat the above procedure s many times as necessary to obtain the desired number of locations within the uniform area. This procedure for randomly selecting locations must be repeated for each metal/concrete surface/soil core sampling event. All locations that are sampled shall be documented for future reference.

## **WIPE TEST PROCEDURE**

### **1.0 Scope and Application**

- 1.1 This procedure is for the sampling of PCBs, dioxins and lead from the surface of a solid.
- 1.2 An area of 100 cm<sup>2</sup> will be wiped with a hexane-moistened swab to remove any surface PCBs and dioxins. Lead wipes will be moistened with a 1:1 nitric acid/distilled water solution.

### **2.0 Apparatus**

#### **2.1 Wipe**

- 2.1.1 Whatman 4 filter paper or the equivalent. Gauze or glass wool may be used but can catch on rough surfaces and unwind or unravel.

#### **2.2 Glass Sample Bottle**

- 2.2.1 Pre-cleaned four ounce wide mouth jars with a teflon or foil lined screw cap.

#### **2.3 Template**

- 2.3.1 Stainless steel template with a 100 sq. cm. opening. Templates must be cleaned with hexane prior to use and stored in aluminum foil. Template dimensions should be one of the following:

- 2.3.1.1 10 cm. x 10 cm square opening

- 2.3.1.2 5 cm x 20 cm rectangular opening

- 2.3.1.3 11.3 cm diameter circular opening

#### **2.3.2 Paper Towels**

- 2.3.2.1 Paper towels for the decontamination of the template after each sample.

#### **2.4 Gloves**

- 2.4.1 Disposable latex gloves, changed after each sample.

### 3.0 Procedure

#### 3.1 Reagents

3.1.1 Hexane: Optima, Fisher Scientific

3.1.2 1:1 Nitric Acid/Distilled Water Solution

#### 3.2 Preparation

3.2.1 The wipe is folded in half and then again down the center so that the two halves of the first crease coincide. The folded filter should be triangular.

3.2.2 The folded wipes are then placed individually into precleaned wide mouth glass jars.

3.2.3 Sufficient hexane or nitric acid solution is added to the wide mouth jar containing the dry wipe so that the wipes become saturated. The jar is then sealed with a foil lined screw cover.

#### 3.3 Procedure

3.3.1 The stainless steel template is cleaned with hexane or the nitric acid solution prior to use and after each sample.

3.3.2 The stainless steel template on the surface to be sampled, after first removing any heavy debris present on the surface. A wet wipe is removed from a jar and quickly wipe the area inside the template, using the wiping pattern described in 3.3.4. The wipe should be kept folded.

3.3.3 Once the inside of the template has been wiped the wipe should be placed in the sample container and the container should be properly labeled.

##### 3.3.4 Wiping Pattern

3.3.4.1 Circular Area: The circular area should be wiped by starting at twelve o'clock on the template and wiping the perimeter in a clockwise direction for one revolution. This pattern will be repeated using smaller circular patterns until the entire area has been wiped. Three or four consecutive wipes should be adequate to completely cover the area.



3.3.4.2 Square Area: A square area should be wiped by starting at the upper left corner and wiping the perimeter in a clockwise direction. The rest of the area is wiped by using four parallel strokes, starting at the top and working towards the bottom. Additional parallel wipes may be required to completely cover the area.

3.3.4.3 Rectangular Area: A rectangular area should be wiped by starting at the upper left corner and wiping the perimeter in a clockwise direction. The remaining area will be wiped using a single additional stroke along the long axis. Additional wipes along the long axis may be required to completely cover the area.

3.3.5 Once the wipe has been placed in the sample container, a label noting the sampler, date, sample identification, job number and analysis should be placed on the sample container.

#### 4.0 Quality Control

4.1 Field blanks must be collected each day at each sampling location. The field blank is used to demonstrate that the samples are not being contaminated by the sampling equipment. Field blank is collected by rinsing the template thoroughly with hexane or nitric acid solution and then wiping the template with a wipe soaked hexane or nitric acid solution, as appropriate. The field blank is placed in a precleaned sample jar and processed as a sample.

4.1.1 Field blanks must be collected prior to collecting any samples and after every twenty samples. At a minimum, two field blanks must be prepared each day.

4.2 Trip blanks must be prepared for each sampling trip. A hexane or nitric acid solution soaked wipe is placed in a sample container prior to leaving the laboratory. The trip blank is taken to the field site and returned to the laboratory unopened. Trip blanks shall be processed as a sample.

4.3 Replicate (duplicate/triplicate) samples must be collected after every twenty samples. This will permit the laboratory to perform matrix spike/matrix spike duplicate analysis.

## 5.0 Sample Transport

### 5.1 Scope and Applicability

- 5.1.1 Samples must be kept and protected in dark storage at 4°C to minimize breakage and cross contamination, and to maintain the integrity of sample custody.

### 5.2 Equipment

- 5.2.1 Insulated carrying container (cooler).
- 5.2.2 Thermometer.
- 5.2.3 Packing materials.
- 5.2.4 Ice.
- 5.2.5 Chain of Custody Form.
- 5.2.6 Chain of Custody Tape.

### 5.3 Procedure

- 5.3.1 Samples should be packed with packing materials or placed in an arrangement such that breakage is minimized.
- 5.3.2 Position a protected thermometer at a representative area in the cooler.
- 5.3.2 Add ice sufficient to maintain 4°C for all samples from point of sample acquisition to the time of arrival at the laboratory.

NOTES: Samples collected at different sites should not be transported together in one carrying container.

Custody tape should be used to seal cooler and/or individual samples, taking care to sign and date across overlap, as per requests of project manager.

## **SAMPLE PROCEDURE SURFACE SOILS**

**Purpose** - Surface soil samples are collected to describe the physical characteristics of the soil or to investigate contamination in the soil.

### **Materials and Equipment** -

- Appropriate sample containers
- Hand corer
- Stainless steel laboratory spoon
- Stainless steel tray
- Clean rags or terry cloths
- $\frac{3}{4}$ " nylon line

### **Procedures:** **Hand Corer**

This method may be utilized when a relative undisturbed sample is required or when samples of up to 6" in depth are required. If necessary, Teflon or brass core liners may be used with this technique to prevent cross-contamination and insure sample integrity.

Assemble a pre-cleaned hand corer by inserting a metal nosepiece into the assembly. Inspect to insure proper operation of the check valve. Insert the corer into the sediment and force it in with a smooth pressure. Twist the corer approximately 90° and slowly withdraw it in a single motion. Remove the nosepiece and withdraw the whole core into a stainless steel tray. Remove a full core length of the sample for VOC analysis and immediately place in VOC vials to minimize volatilization. Transfer the remaining sample (if VOC samples are removed) to a stainless steel bucket using a stainless steel laboratory spoon. Blend the sample with the spoon to thoroughly homogenize the sample. Transfer homogenized sample to appropriate sample analysis containers. Cap and seal the sample container. Flush the corer with clean water to remove any residual sediment. Wash the sample tray with clean water and wipe it down with rags or terry cloths.

**Records and Documentation** - Samples will be labeled, preserved, and stored in accordance with these Standard Procedures.

**ATTACHMENT D**

**CLEANUP PERFORMAMNCE STANDARD**

268.43.—TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters Concentration (mg/l)	Notes	Nonwastewaters Concentration (mg/l)	Notes
K052	NA	Table CCWE in 268.41	o-Cresol	95-48-7	0.11	(?)	6.2	(?)
			p-Cresol	106-44-5	0.77	(?)	6.2	(?)
			2,4-Dimethylphenol	105-67-8	0.036	(?)	NA	(?)
			Ethylbenzene	100-41-4	0.057	(?)	14	(?)
			Naphthalene	91-20-3	0.059	(?)	42	(?)
			Phenanthrene	85-01-8	0.059	(?)	34	(?)
			Phenol	108-95-2	0.039	(?)	3.6	(?)
			Toluene	108-88-3	0.08	(?)	14	(?)
			Xylenes		0.32	(?)	22	(?)
			Cyanides (Total)	56-12-5	0.028	(?)	1.8	(?)
			Chromium (Total)	7440-47-32	0.2		NA	
			Lead	7439-92-1	0.037		NA	
K087	NA	Table CCWE in 268.41	Acenaphthalene	208-96-8	0.059	(?)	3.4	(?)
			Benzene	71-43-2	0.14	(?)	0.071	(?)
			Chrysene	218-01-9	0.059	(?)	3.4	(?)
			Fluoranthene	205-44-0	0.068	(?)	3.4	(?)
			Indeno (1,2,3-cd) pyrene	193-39-5	0.0055	(?)	3.4	(?)
			Naphthalene	91-20-3	0.059	(?)	3.4	(?)
			Phenanthrene	85-01-8	0.059	(?)	3.4	(?)
			Toluene	108-88-3	0.08	(?)	0.65	(?)
			Xylenes		0.32	(?)	0.07	(?)
			Lead	7439-92-1	0.037		NA	
K093	NA		Phthalic anhydride (measured as Phthalic acid)	85-44-9	0.069		28	(?)
K094	NA		Phthalic anhydride (measured as Phthalic acid)	85-44-9	0.069		28	(?)
K111	NA		2,4-Dinitrotoluene	121-14-2	0.32		140	(?)
			2,6-Dinitrotoluene	606-20-2	0.55		28	(?)
K117	NA		Ethylene dibromide	106-93-4	0.028		15	(?)
			Methyl bromide	74-83-9	0.11		15	(?)
			Chloroform	67-66-3	0.046		5.6	(?)
K118	NA		Ethylene dibromide	106-93-4	0.028		15	(?)
			Methyl bromide	74-83-9	0.11		15	(?)
			Chloroform	67-66-3	0.046		5.6	(?)
K131	NA		Methyl bromide	74-83-9	0.11		15	(?)
K132	NA		Methyl bromide	74-83-9	0.11		15	(?)
K136	NA		Ethylene dibromide	106-93-4	0.028		15	(?)
			Methyl bromide	74-83-9	0.11		15	(?)
			Chloroform	67-66-3	0.046		5.6	(?)
U028	Bis(2-ethylhexyl) phthalate		Bis(2-ethylhexyl) phthalate	117-81-7	0.29		29	(?)
U069	Di-n-butyl phthalate		Di-n-butyl phthalate	84-74-2	0.057		28	(?)
U088	Diethyl phthalate		Diethyl phthalate	84-66-2	0.2		29	(?)
U102	Dimethyl phthalate		Dimethyl phthalate	131-11-3	0.047		29	(?)
U107	Di-n-octyl phthalate		Di-n-octyl phthalate	117-84-0	0.017		29	(?)
U190	Phthalic anhydride (measured as Phthalic acid)		Phthalic anhydride (measured as Phthalic acid)	85-44-9	0.069		28	(?)

\* Treatment standards for this organic constituent were established based upon incineration in units operated in accordance with the technical requirements of 40 CFR 264 Subpart O or Part 265 Subpart O, or based upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may certify compliance with these treatment standards according to provisions in 40 CFR Section 268.7.

\* Based on analysis of composite samples.

NOTE: NA means Not Applicable.

38. In subpart D, § 268.45 with Table 1 is added to read as follows:

§ 268.45. Treatment standards for hazardous debris.

(a) Treatment standards. Hazardous debris must be treated prior to land

disposal as follows unless EPA determines under § 281.3(e)(2) of this chapter that the debris is no longer contaminated with hazardous waste or

*Land Disposal Unit for Newly Listed Wastes + Hazardous Debris Rule*

the debris is treated to the waste-specific treatment standard provided in this subpart for the waste contaminating the debris:

(1) *General Hazardous debris* must be treated for each "contaminant subject to treatment" defined by paragraph (b) of this section using the technology or technologies identified in Table 1 of this section.

(2) *Characteristic debris*. Hazardous debris that exhibits the characteristic of ignitability, corrosivity, or reactivity identified under §§ 261.21, 261.22, and 261.23 of this chapter, respectively, must be deactivated by treatment using one of the technologies identified in Table 1 of this section.

(3) *Mixtures of debris types*. The treatment standards of Table 1 in this section must be achieved for each type of debris contained in a mixture of debris types. If an immobilization technology is used in a treatment train, it must be the last treatment technology used.

(4) *Mixtures of contaminant types*. Debris that is contaminated with two or more contaminants subject to treatment identified under paragraph (b) of this section must be treated for each contaminant using one or more treatment technologies identified in Table 1 of this section. If an immobilization technology is used in a treatment train, it must be the last treatment technology used.

(5) *Waste PCBs*. Hazardous debris that is also a waste PCB under 40 CFR part 761 is subject to the requirements of either 40 CFR part 761 or the

requirements of this section, whichever are more stringent.

(b) *Contaminants subject to treatment*. Hazardous debris must be treated for each "contaminant subject to treatment." The contaminants subject to treatment must be determined as follows:

(1) *Toxicity characteristic debris*. The contaminants subject to treatment for debris that exhibits the Toxicity Characteristic (TC) by § 261.24 of this chapter are those EP constituents for which the debris exhibits the TC toxicity characteristic.

(2) *Debris contaminated with listed waste*. The contaminants subject to treatment for debris that is contaminated with a prohibited listed hazardous waste are those constituents for which BDAT standards are established for the waste under §§ 268.41 and 268.43.

(3) *Cyanide reactive debris*. Hazardous debris that is reactive because of cyanide must be treated for cyanide.

(c) *Conditioned exclusion of treated debris*. Hazardous debris that has been treated using one of the specified extraction or destruction technologies in Table 1 of this section and that does not exhibit a characteristic of hazardous waste identified under subpart C, part 261 of this chapter after treatment is not a hazardous waste and need not be managed in a subtitle C facility.

Hazardous debris contaminated with a listed waste that is treated by an immobilization technology specified in

Table 1 is a hazardous waste and must be managed in a subtitle C facility.

(d) *Treatment residuals*—(1) *General requirements*. Except as provided by paragraphs (d)(2) and (d)(4) of this section:

(i) Residue from the treatment of hazardous debris must be separated from the treated debris using simple physical or mechanical means; and

(ii) Residue from the treatment of hazardous debris is subject to the waste-specific treatment standards provided by subpart D of this part for the waste contaminating the debris.

(2) *Nontoxic debris*. Residue from the deactivation of ignitable, corrosive, or reactive characteristic hazardous debris (other than cyanide-reactive) that is not contaminated with a contaminant subject to treatment defined by paragraph (b) of this section, must be deactivated prior to land disposal and is not subject to the waste-specific treatment standards of subpart D of this part.

(3) *Cyanide-reactive debris*. Residue from the treatment of debris that is reactive because of cyanide must meet the standards for D003 under § 268.43.

(4) *Ignitable nonwastewater residue*. Ignitable nonwastewater residue containing equal to or greater than 10% total organic carbon is subject to the technology-based standards for D001: "Ignitable Liquids based on § 261.21(a)(1)" under § 268.42.

(5) *Residue from spalling*. Layers of debris removed by spalling are hazardous debris that remain subject to the treatment standards of this section.

TABLE 1.—ALTERNATIVE TREATMENT STANDARDS FOR HAZARDOUS DEBRIS

Technology description	Performance and/or design and operating standard	Contaminant restrictions <sup>2</sup>
<b>A. Extraction Technologies:</b>		
<b>1. Physical Extraction:</b>		
a. <i>Abrasive Blasting</i> : Removal of contaminated debris surface layers using water and/or air pressure to propel a solid media (e.g., steel shot, aluminum oxide grit, plastic beads).	Glass, Metal, Plastic, Rubber: Treatment to a clean debris surface. <sup>3</sup> Brick, Clay, Concrete, Paper, Pavement, Rock, Wood: Removal of at least 0.5 cm of the surface layer; treatment to a clean debris surface. <sup>3</sup>	All Debris: None.
b. <i>Scarification, Grinding, and Planing</i> : Process utilizing striking piston heads, saws, or routing grinding wheels such that contaminated debris surface layers are removed.	Same as above.	Same as above.
c. <i>Scaling</i> : Drilling or chipping holes at appropriate locations and depth in the contaminated debris surface and applying a tool which exerts a force on the sides of those holes such that the surface layer is removed. The surface layer removed remains hazardous debris subject to the debris treatment standards.	Same as above.	Same as above.
d. <i>Vibratory Finishing</i> : Process utilizing scrubbing media, flushing fluid, and oscillating energy such that hazardous contaminants or contaminated debris surface layers are removed.	Same as above.	Same as above.

TABLE 1.—ALTERNATIVE TREATMENT STANDARDS FOR HAZARDOUS DEBRIS<sup>1</sup>—Continued

Technology description	Performance and/or design and operating standard	Contaminant restrictions
<p>a. <i>High Pressure Steam and Water Sprays:</i> Application of water or steam sprays of sufficient temperature, pressure, residence time, agitation, surfactants, and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers.</p> <p>2. <i>Chemical Extraction</i></p> <p>a. <i>Water Washing and Spraying:</i> Application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases, and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove contaminated debris surface layers.</p> <p>b. <i>Liquid Phase Solvent Extraction:</i> Removal of hazardous contaminants from debris surfaces and surface pores by applying a nonaqueous liquid or liquid solution which causes the hazardous contaminants to enter the liquid phase and be flushed away from the debris along with the liquid or liquid solution while using appropriate agitation, temperature, and residence time.</p> <p>c. <i>Vapor Phase Solvent Extraction:</i> Application of an organic vapor using sufficient agitation, residence time, and temperature to cause hazardous contaminants on contaminated debris surfaces and surface pores to enter the vapor phase and be flushed away with the organic vapor.</p> <p>3. <i>Thermal Extraction</i></p> <p>a. <i>High Temperature Metals Recovery:</i> Application of sufficient heat, residence time, mixing, fluxing agents, and/or carbon in a smelting, melting, or refining furnace to separate metals from debris.</p> <p>b. <i>Thermal Desorption:</i> Heating in an enclosed chamber under either oxidizing or nonoxidizing atmospheres at sufficient temperature and residence time to vaporize hazardous contaminants from contaminated surfaces and surface pores and to remove the contaminants from the heating chamber in a gaseous exhaust gas.</p>	<p>Same as above.</p> <p><i>All Debris:</i> Treatment to a clean debris surface. <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (1/2 inch) in one dimension (i.e., thickness limit), except that this thickness limit may be waived under an "Equivalent Technology" approval under § 268.42(b); debris surfaces must be in contact with water solution for at least 15 minutes.</p> <p>Same as above.</p> <p>Same as above, except that brick, cloth, concrete, paper, pavement, rock and wood surfaces must be in contact with the organic vapor for at least 60 minutes.</p> <p>For refining furnaces, treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>2</sup> and, prior to further treatment, such residuals must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.</p> <p><i>All Debris:</i> Obtain an "Equivalent Technology" approval under § 268.42(b); treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>2</sup> and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.</p> <p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 10 cm (4 inches) in one dimension (i.e., thickness limit), except that this thickness limit may be waived under the "Equivalent Technology" approval.</p> <p><i>All Debris:</i> Obtain an "Equivalent Technology" approval under § 268.42(b); treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>2</sup> and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.</p> <p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (1/2 inch) in one dimension (i.e., thickness limit), except that this thickness limit may be waived under the "Equivalent Technology" approval.</p> <p><i>All Debris:</i> Obtain an "Equivalent Technology" approval under § 268.42(b); treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>2</sup> and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.</p> <p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (1/2 inch) in one dimension (i.e., thickness limit), except that this thickness limit may be waived under the "Equivalent Technology" approval.</p>	<p>Same as above.</p> <p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Contaminant must be soluble to at least 5% by weight in water solution or 5% by weight in emulsion; if debris is contaminated with a documented waste,<sup>3</sup> an "Equivalent Technology" approval under § 268.42(b) must be obtained.</p> <p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Same as above, except that contaminant must be soluble to at least 5% by weight in the solvent.</p> <p>Same as above.</p> <p><i>Debris contaminated with a documented waste:</i> Obtain an "Equivalent Technology" approval under § 268.42(b).</p> <p><i>All Debris:</i> Metals other than mercury.</p> <p><i>All Debris:</i> Metal contaminants.</p> <p><i>All Debris:</i> Metal contaminants.</p>
<p>B. <i>Destruction Technologies:</i></p> <p>1. <i>Biological Destruction (Biodegradation):</i> Removal of hazardous contaminants from debris surfaces and surface pores in an aqueous solution and biodegradation of organic or nonmetallic inorganic compounds (i.e., inorganics that contain phosphorus, nitrogen, or sulfur) in units operated under either aerobic or anaerobic conditions.</p> <p>2. <i>Chemical Destruction</i></p> <p>a. <i>Chemical Oxidation:</i> Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combination of reagents: (1) hypochlorite (e.g., bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultra-violet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permanganates; and/or (9) other oxidizing reagents of equivalent destruction efficiency.<sup>4</sup> Chemical oxidation specifically includes what is referred to as alkaline chlorination.</p>		

TABLE 1.—ALTERNATIVE TREATMENT STANDARDS FOR HAZARDOUS DEBRIS<sup>1</sup>—Continued

Technology description	Performance, and/or design and operating standard	Contaminant restrictions <sup>2</sup>
<p>b. <b>Chemical Reduction:</b> Chemical reaction utilizing the following reducing reagents (or waste reagents) or combination of reagents: (1) sulfur dioxide; (2) sodium, potassium, or alkali salts of sulfites, bisulfites, and metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts and/or (5) other reducing reagents of equivalent efficiency.</p> <p>3. <b>Thermal Destruction:</b> Treatment in an incinerator operating in accordance with Subpart O of Part 254 or 255 of this chapter, a boiler or industrial furnace operating in accordance with Subpart H of Part 256 of this chapter, or other thermal treatment unit operated in accordance with Subpart X, Part 254 of this chapter, or Subpart P, Part 265 of this chapter, but excluding for purposes of these debris treatment standards Thermal Desorption units.</p> <p>c. <b>Immobilization Technologies:</b></p> <p>1. <b>Macroencapsulation:</b> Application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media.</p> <p>2. <b>Microencapsulation:</b> Stabilization of the debris with the following reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: (1) Portland cement or (2) lime/pozzolans (e.g., fly ash and cement kiln dust). Reagents (e.g., iron salts, silicates, and clays) may be added to enhance the set/cure time and/or compressive strength, or to reduce the leachability of the hazardous constituents.</p> <p>3. <b>Sealing:</b> Application of an appropriate material which adheres tightly to the debris surface to avoid exposure of the surface to potential leaching media. When necessary to effectively seal the surface, sealing entails pretreatment of the debris surface to remove foreign matter and to clean and roughen the surface. Sealing materials include epoxy, silicone, and urethane compounds, but paint may not be used as a sealant.</p>	<p>Same as above.</p> <p>Treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>3</sup> and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste containing the debris.</p> <p>Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes). Leachability of the hazardous contaminants must be reduced.</p> <p>Sealing must avoid exposure of the debris surface to potential leaching media and sealant must be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes).</p>	<p>Same as above.</p> <p>Brick, Concrete, Glass, Metal, Pavement, Rock, Metal, Metals other than mercury, except that there are no metal restrictions for verification. Debris contaminated with a dioxin-listed waste.<sup>4</sup> Obtain an "Equivalent Technology" approval under § 258.42(b),<sup>5</sup> except that this requirement does not apply to verification.</p> <p>None.</p> <p>None.</p> <p>None.</p>

<sup>1</sup> Hazardous debris must be treated by either these standards or the waste-specific treatment standards for the waste contaminating the debris. The treatment standards must be met for each type of debris contained in a mixture of debris types, unless the debris is converted into treatment residue as a result of the treatment process. Debris treatment residues are subject to the waste-specific treatment standards for the waste contaminating the debris.

<sup>2</sup> Contaminant restriction means that the technology is not EDAT for that contaminant. If debris containing a restricted contaminant is treated by the technology, the contaminant must be subsequently treated by a technology for which it is not restricted in order to be land disposed (and excluded from Subpart C regulation).

<sup>3</sup> "Clean debris surface" means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

<sup>4</sup> Acids, solvents, and chemical reagents may react with some debris and contaminants to form hazardous compounds. For example, acid washing of cyanide-contaminated debris could result in the formation of hydrogen cyanide. Some acids may also react violently with some debris and contaminants, depending on the concentration of the acid and the type of debris and contaminants. Debris treaters should refer to the safety precautions specified in Material Safety Data Sheets for various acids to avoid applying an incompatible acid to a particular debris/contaminant combination. For example, concentrated sulfuric acid may react violently with certain organic compounds, such as acrylonitrile.

<sup>5</sup> If reducing the particle size of debris to meet the treatment standards results in material that no longer meets the 60 mm minimum particle size limit for debris, such material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and waste prior to size reduction. At a minimum, simple physical or mechanical means must be used to provide such cleaning and separation of nondebris materials to ensure that the debris surface is free of caked soil, waste, or other nondebris material.

<sup>6</sup> Dioxin-listed wastes are EPA Hazardous Waste numbers F020, F021, F022, F023, F025, and F027.

<sup>7</sup> Thermal desorption is distinguished from Thermal Destruction in that the primary purpose of Thermal Desorption is to volatilize contaminants and to remove them from the treatment chamber for subsequent destruction or other treatment.

<sup>8</sup> The demonstration "Equivalent Technology" under § 258.42(b) must document that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for other technologies in this table such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent management controls.

<sup>9</sup> Any soil, waste, and other nondebris material that remains on the debris surface (or remains mixed with the debris) after treatment is considered a treatment residual that must be separated from the debris using, at a minimum, simple physical or mechanical means. Examples of simple physical or mechanical means are vibratory or trommel screening or water washing. The debris surface need not be cleaned to a "clean debris surface" as defined in note 3 when separating treated debris from residue; rather, the surface must be free of caked soil, waste, or other nondebris material. Treatment residues are subject to the waste-specific treatment standards for the waste contaminating the debris.

39. In subpart D, § 268.46 is added to read as follows:

§ 268.46 Alternative treatment standards based on HTMR.

Table 1 identifies alternative treatment standards for F006 and K062 nonwastewaters.



**ATTACHMENT E**

**COCHRAN'S APPROXIMATION**

## APPENDIX E

### COCHRAN'S APPROXIMATION TO THE BEHRENS-FISHER STUDENT'S T-TEST

Using all the available background data ( $n_B$  readings), calculate the background mean ( $X_B$ ) and background variance ( $s_B^2$ ). For the single location under investigation ( $n_M$  reading), calculate the monitoring mean ( $X_M$ ) and the monitoring variance ( $s_M^2$ ).

For any set of data ( $X_1, X_2, X_3, \dots, X_n$ ), the mean is calculated by;

$$X = \frac{X_1 + X_2 + \dots + X_n}{n}$$

and the variance is calculated by:

$$S^2 = \frac{(X_1 - X)^2 + (X_2 - X)^2 + \dots + (X_n - X)^2}{n-1}$$

where "n" denotes the number of observations in the set of data.

The t-test uses these data summary measures to calculate a t-statistic ( $t'$ ) and a comparison t-statistic ( $t_c$ ). The  $t'$  value is compared to the  $t_c$  value and a conclusion reached as to whether there has been a statistically significant change in any indicator parameter value.

The t-statistic for all parameters except pH and similar monitoring parameter value is:

$$t' = \frac{X_m - X_B}{(s_m^2 / n_m + s_B^2 / n_B)}$$

If the value of the t-statistic is negative, then there is no significant difference between the monitoring data and background data. It should be noted that significantly small negative values may be indicative of a failure of the assumption made for test validity or errors have been made in collecting background data.

The t-statistic ( $t_c$ ), against which  $t'$  will be compared, necessitates finding  $t_B$  and  $t_m$  from standard (one tailed) tables  $t_B = t$ -tables with  $(n_B-1)$  degrees of freedom, at the 0.05 level of significance.

$t_m = t$ -tables with  $(n_m-1)$  degrees of freedom, at the 0.05 level of significance.

Finally, the special weighing  $W_B$  and  $W_m$  are defined as:

and so the comparison t-statistic is:

$$W_B = \frac{s_B^2}{n_B}$$

$$t_c = \frac{W_B x t_B + W_m x t_m}{W_B + W_m}$$

The t-statistic

(t') is now compared with the comparison t-statistic ( $t_c$ ) using the following decision rule:

$$W_m = \frac{s_m^2}{n_m}$$

If t' is equal to or greater than  $t_c$ , then conclude there is most likely has been a significant increase in this specific parameter. If t' is less than  $t_c$ , then conclude that most likely there has not been a change in this specific parameter.

Table 3  
Standard t-Tables

0.05 Level of Significants

Degrees of Freedom	t-values (one tail)	t-values (two tail)
1	6.314	12.706
2	2.920	4.303
3	2.353	3.182
4	2.132	2.776
5	2.015	2.571
6	1.943	2.447
7	1.895	2.365
8	1.860	2.306
9	1.833	2.262
10	1.812	2.228
11	1.796	2.201
12	1.782	2.179
13	1.771	2.160
14	1.761	2.145
15	1.753	2.131
16	1.746	2.120
17	1.740	2.110
18	1.734	2.101
19	1.729	2.093
20	1.725	2.086
21	1.721	2.080
22	1.717	2.074
23	1.714	2.069

24	1.711	2.064
25	1.708	2.060
30	1.697	2.042
40	1.684	2.021

Adopted from Table III of "Statistical Tables for Biological, Agricultural, and Medical Research" (1974, R. A. Fisher and F. Yates).

The t-statistic for pH and similar monitoring parameters is constructed in the same manner as previously described except the negative sign (if any) is discarded and the caveat concerning the negative value is ignored. The standard (two tailed) tables are used in the construction  $t_c$  for pH and similar monitoring parameters.

C325\REPORT\APPEND-E.

**FIGURES**

Figure 1

LOCUS PLAN

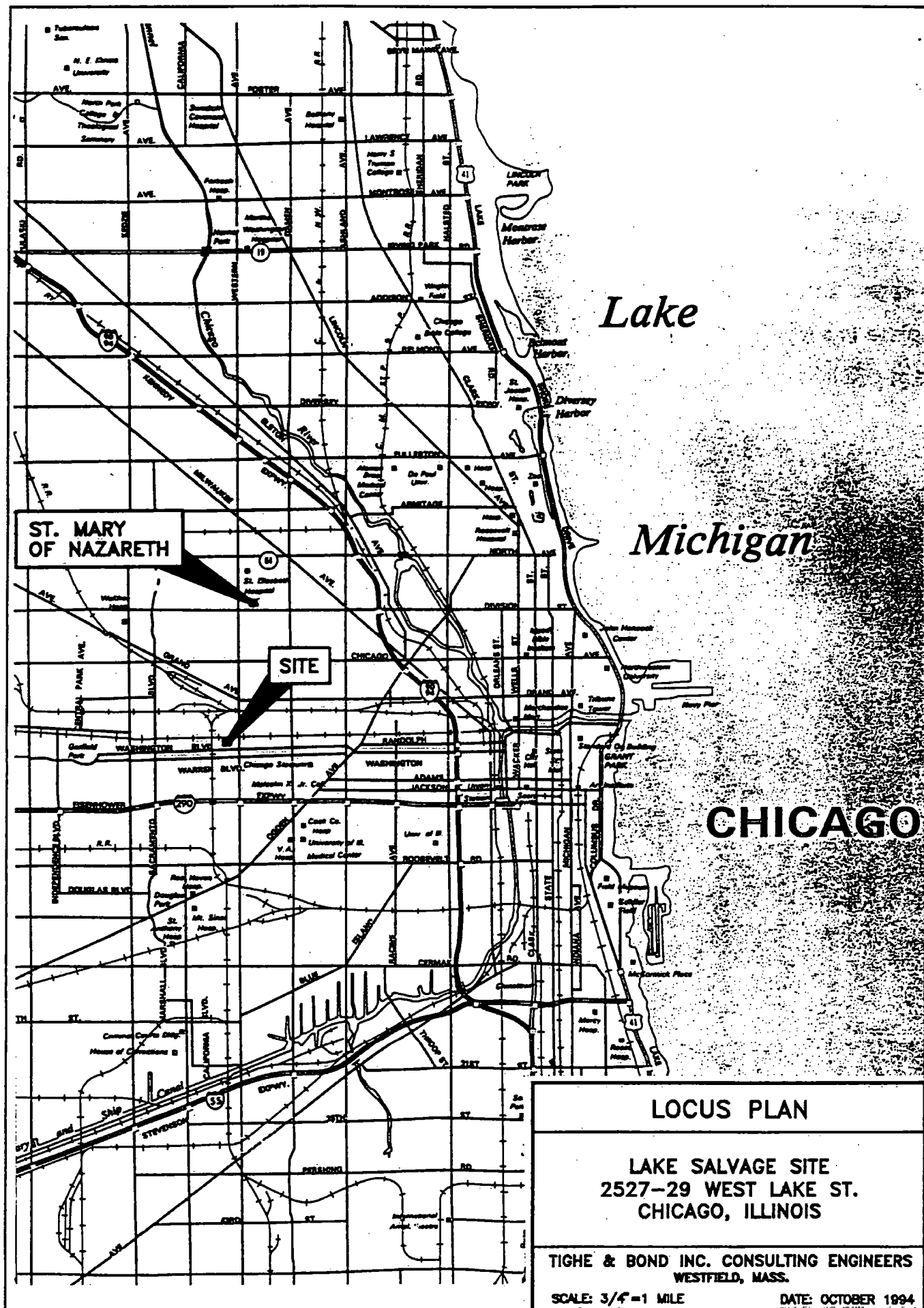
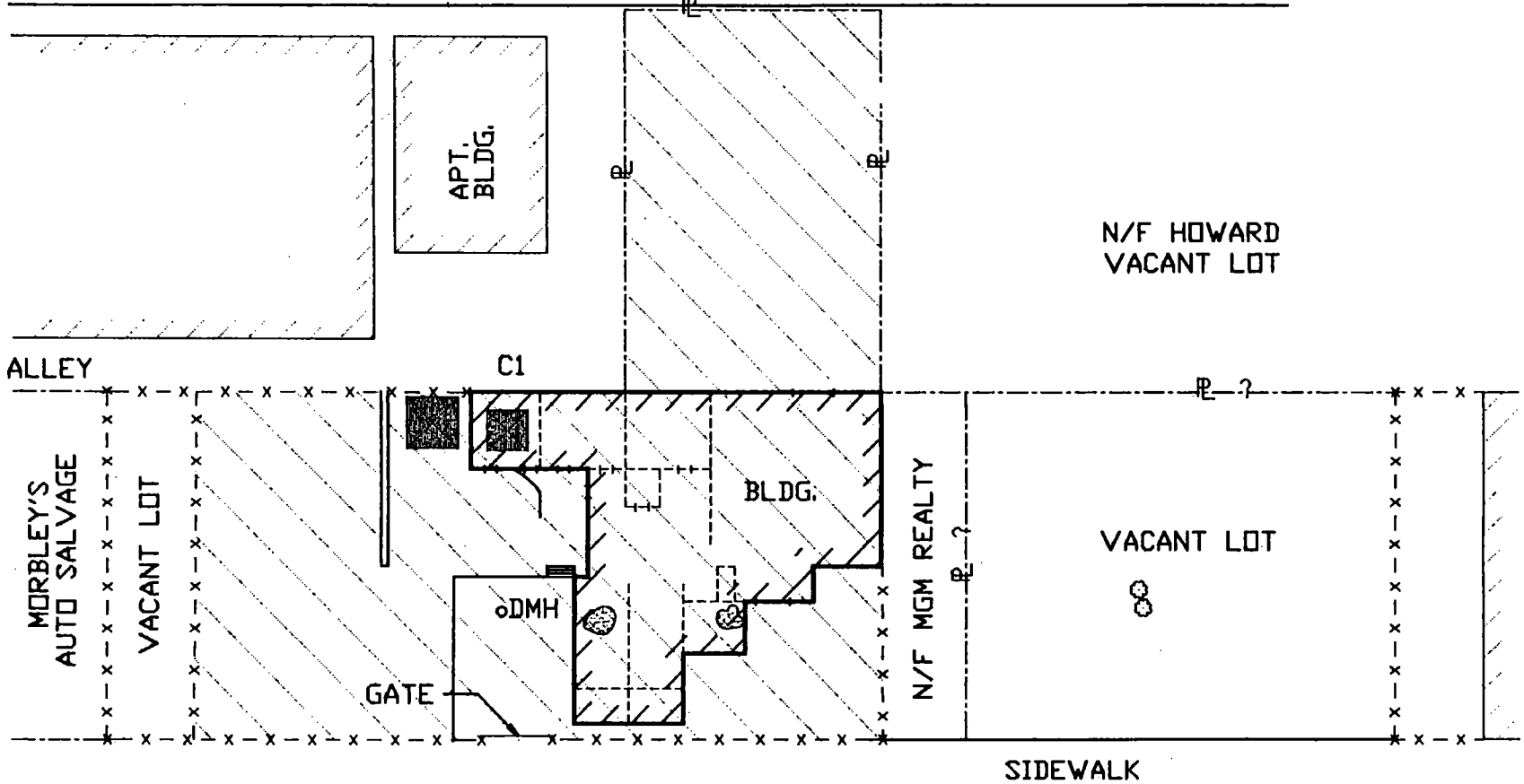


Figure 2

SITE PLAN



MAYPOLE AVENUE



WEST LAKE STREET

SIDEWALK

PEKAY MFG.

**LEGEND**



INCINERATOR



SITE



EXTERIOR WALL



REMAINING ASH PILE (~1-2 cy.)



PROPERTY LINE



FENCE

**FIGURE 2**

**SITE PLAN  
LAKE SALVAGE CO.  
CHICAGO, IL**

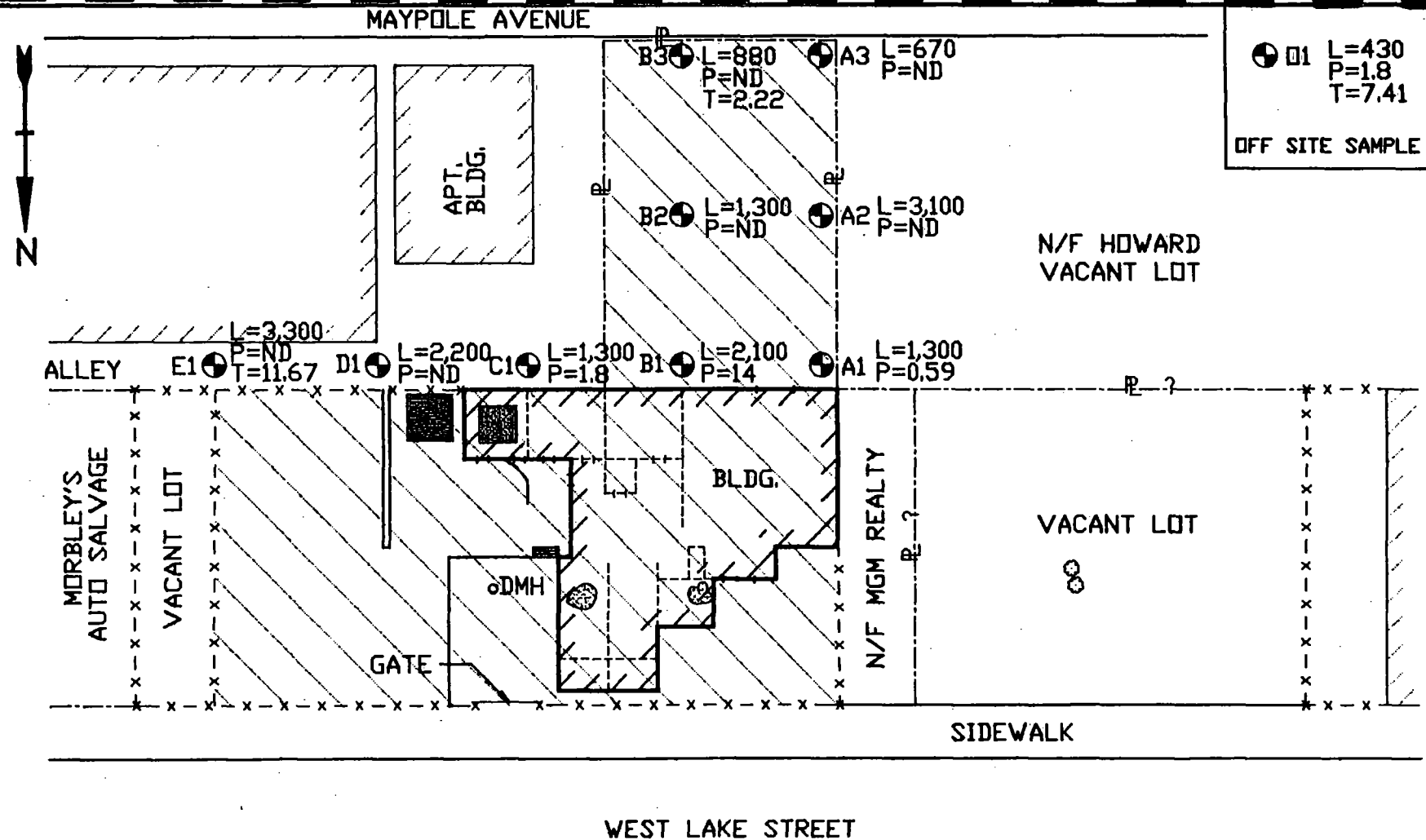
**TIGHE & BOND INC. CONSULTING ENGINEERS  
WESTFIELD, MASS.**

SCALE: 1"=50'

DATE: DEC. 1994

**Figure 3**

**SOIL SAMPLING RESULTS**



● D1 L=430  
P=1.8  
T=7.41

OFF SITE SAMPLE

B3 L=880  
P=ND  
T=2.22

A3 L=670  
P=ND

B2 L=1,300  
P=ND

A2 L=3,100  
P=ND

L=3,300

E1 L=3,300  
P=ND  
T=11.67

D1 L=2,200  
P=ND

C1 L=1,300  
P=1.8

B1 L=2,100  
P=14

A1 L=1,300  
P=0.59

N/F HOWARD  
VACANT LOT

VACANT LOT

SIDEWALK

WEST LAKE STREET

SIDEWALK

PEKAY MFG.

FIGURE 3

SOIL SAMPLING RESULTS  
LAKE SALVAGE CO.  
CHICAGO, IL

TIGHE & BOND INC. CONSULTING ENGINEERS  
WESTFIELD, MASS.

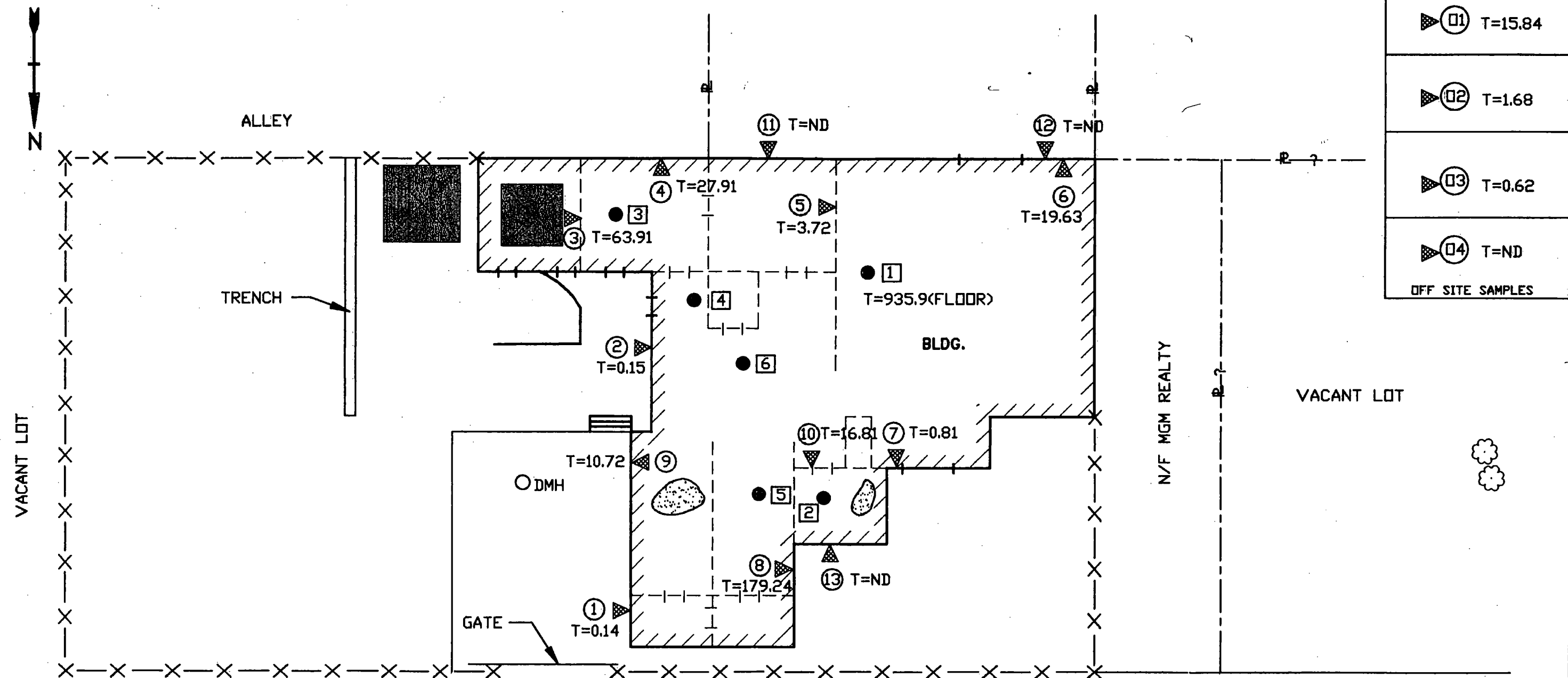
SCALE: 1"=50'

DATE: DEC. 1994



Figure 4

WALL WIPES - RESULTS



# **LEGEND**

- |      |                                  |     |               |
|------|----------------------------------|-----|---------------|
| ● 16 | WIPE SAMPLE - LITTER/FLOOR       | /// | EXTERIOR WALL |
| ▼ 13 | WIPE SAMPLE - WALL               | --- | INTERIOR WALL |
| T=   | TOTAL DIOXINS pg/cm <sup>2</sup> | -X- | FENCE LINE    |
| 17   | REMAINING ASH PILE               | -P- | PROPERTY LINE |
| ■    | INCINERATOR                      |     |               |

**FIGURE 4**

**TOTAL DIOXINS WALL WIPE RESULTS  
LAKE SALVAGE CO.  
CHICAGO, IL**

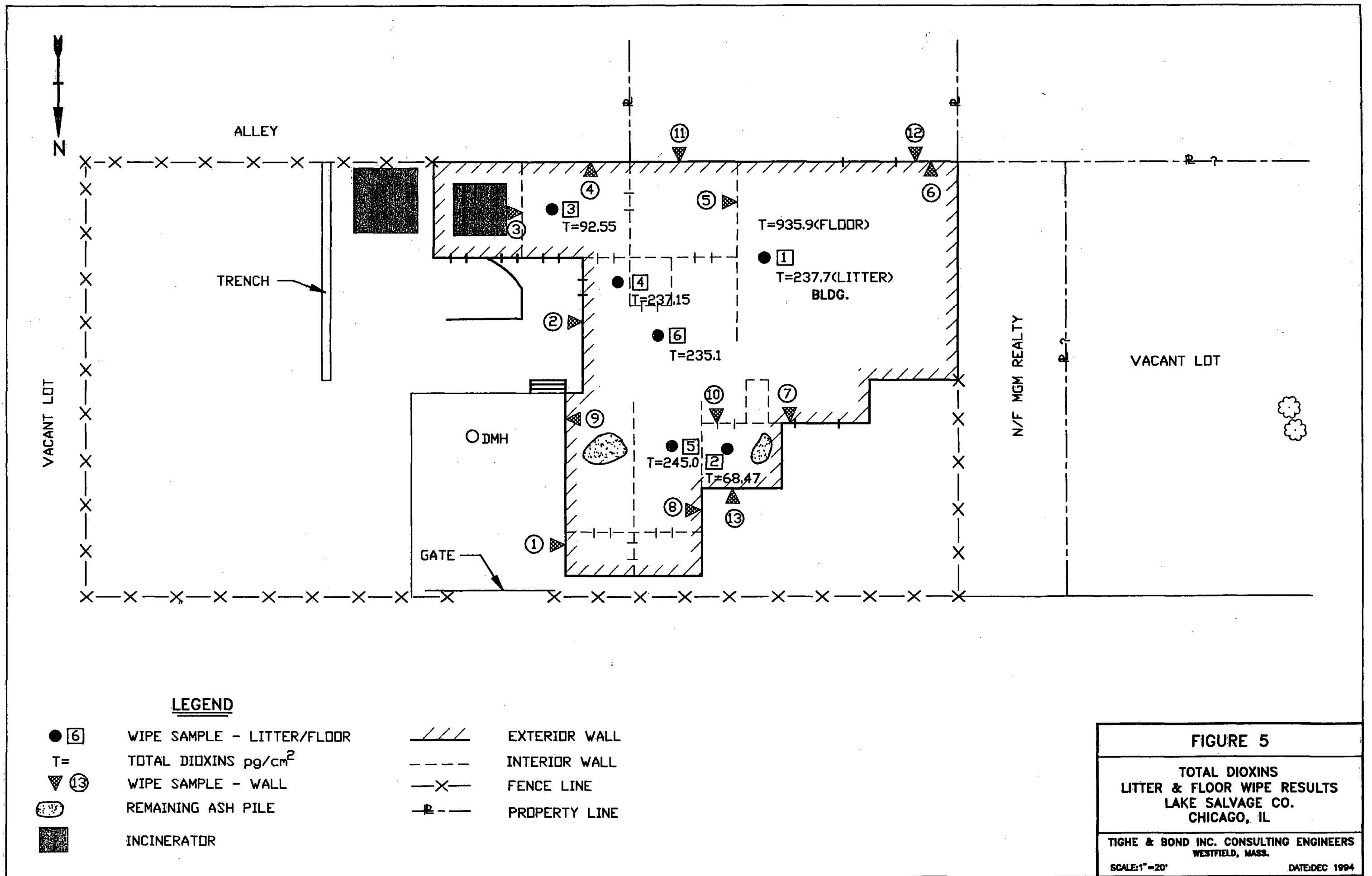
**TIGHE & BOND INC. CONSULTING ENGINEERS  
WESTFIELD, MASS.**

SCALE: 1"=20'

DATE: DEC 1984

**Figure 5**

**LITTER & FLOOR WIPE RESULTS**





**Figure 6**

**WIPE SAMPLE RESULTS - SUMMARY**

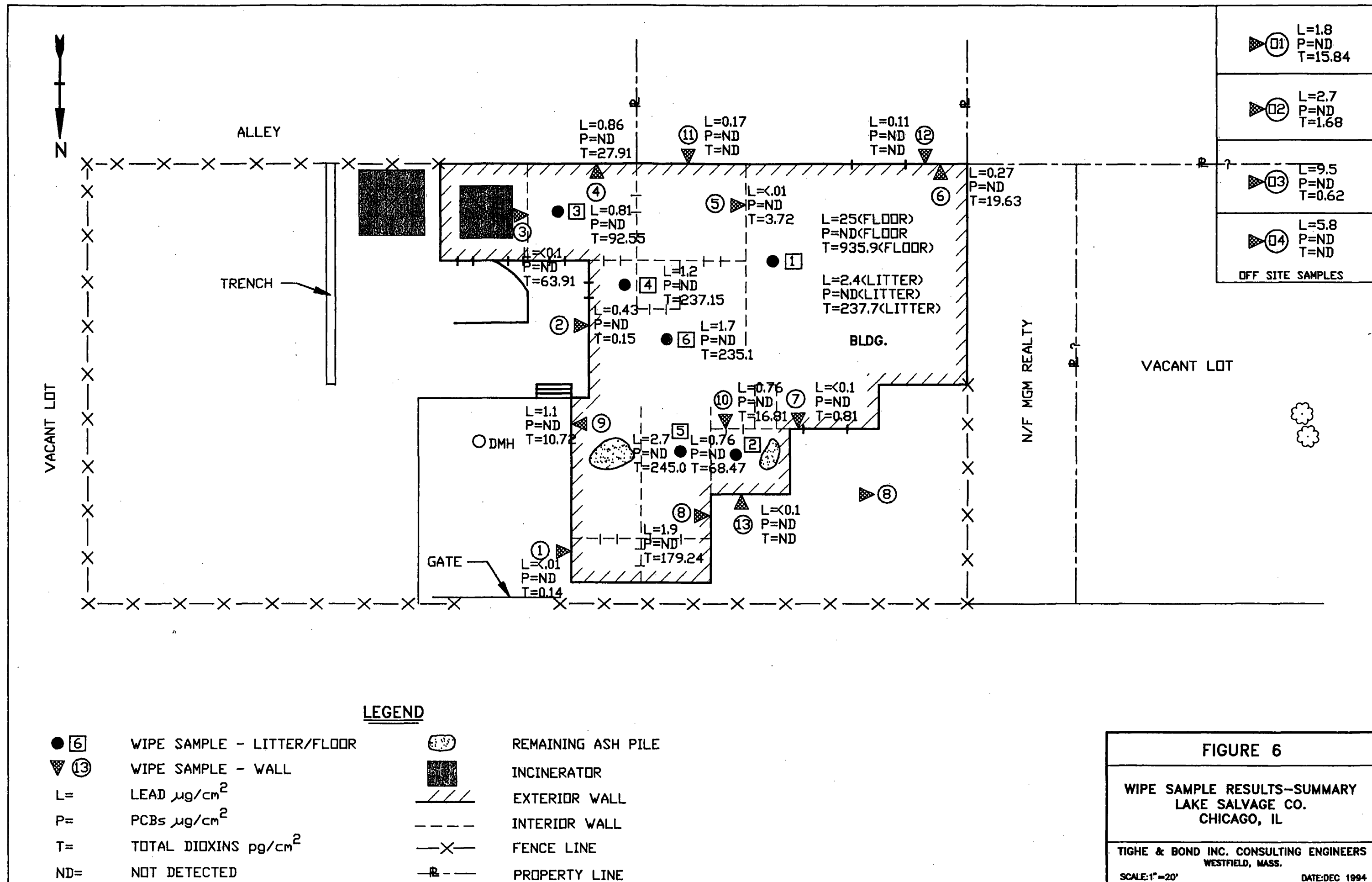


Figure 7

BUILDING AREA DESIGNATIONS

